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THE LARYNGOSCOPE.

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No. 10

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding
that they are contributed exclusively to THE LARYNGOSCOPE.)

POT POURRI.*

DR. R. C. LYNCH, New Orleans, La.

I had hoped to present to you today some new thoughts on some new phases of our work upon which I have been working for the last year or more, but I am sorry to say that as yet I have nothing complete enough to present at this time. I have gathered those observations which have been of most interest to me during this last year and called them a Pot Pourri, which is the French for a mixture be it meat, mush, music or medicine.

A little girl of mine left the Gulf Coast somewhat hoarse. On arriving in New Orleans three hours later she was aphonic and croupy. A pediatrician was at once summoned and administered 20,000 units of antitoxin with some bromides and glyco-heroin to quiet the spasm, relieve the cough and anxiety. A restless night and continuation of symptoms called for 50,000 units of antitoxin, a cool room, free purgation and a small amount of phenacetin to counteract a proteid temperature reaction. Pharyngeal examination showed no pathology and cultures from the hypo-pharynx, no diphtheria. Heart and lungs were normal, bowels flushed thoroughly, urine free from albumin, casts and pus cells. The day increased the distress and late in the evening respiration became more difficult, with increasing restlessness, pallor and tracheal tug.

I saw her in this state. Tracheotomy was done without anesthesia. On opening the trachea a large piece of exudate was coughed out and the trachea was seen to be covered with exudate

*President's Address, American Bronchoscopic Society, St. Louis, May 28, 1924.

which did not resemble the diphtheretic cases I had seen before. Cultures were taken and the exudate saved for section and study. Every effort made to increase tracheo-bronchial secretion. Room warm to 80°, a steam kettle with lime water only, ipecac and iodides in almost homeopathic doses but frequently repeated, tepid bland fluids freely, with a mild alkaline diuretic; these measures were followed by a softening of the exudate and its gradual casting off, though this period lasted about ten days.

The following day a bronchoscopy was done through the tracheal wound and the exudate seen to extend just beyond the bifurcation, the bronchi below this point were clear and free from even evidences of inflammation. A study of fourteen cultures taken at intervals through the tracheal wound showed staphylococci albus in almost pure culture. The exudate section showed nothing but fibrin inclosing some few dead epithelial cells, and a few leucocytes and with practically no or but very few bacteria.

Progress toward recovery was quite slow in contrast to the diphtheretic processes, when recovery is complete with no sequelae.

This is a brief description of a staphylococcus albus exudative tracheo-bronchitis of which we saw five cases in one month's time—an old disease revived to bring out certain points in its pathology and treatment.

Primarily a catarrhal inflammation which extends in more severe instances into the sub-mucous layers, and is therefore accompanied by infiltration and extravasation of inflammatory process followed by its organization and this more so if early treatment provide against free secretion, since this will increase the swelling and edema and in the case of the sub-glottic area, trachea and upper bronchi be accompanied by much narrowing and thickening, causing marked stenosis, a very slow absorption and return to normal lumen and function.

Since the pathology is not limited to the mucous membrane alone but usually extends below its vascular layer into the areola tissue beneath, tumefaction is more constant. In the most profound cases casting off of the upper layers is by process of necrosis, ulceration and destruction of both surface and sub-epithelial layers takes place. In the milder forms however, while tumefaction does take place only the most superficial epithelial layer or layers are cast off and usually without noticeable scar; this was observed in the membrane recovered during the tracheotomy, the remainder of the membrane was cast off not en bloc as in Klebs-Loeffer infections but by solution.

Antitoxin is useless, all measures which inhibit gland secretion are contra indicated, fresh cool air and changing temperatures must be avoided. Warm moist air, of even temperature, free purgation

of the tracheo-bronchial tree with such drugs as ipecac, small doses of iodides, not over three grains, small doses of calomel and tarter emetic or squill are to be relied upon coupled with mild non-irritating alkaline diuretics and intestinal flushing (meet the requirements in full). Do not attempt decantation until absorption of inflammatory exudate is complete, for the negative pressure, venous stasis, and reproduction of edema will delay the recovery markedly. Intubation for this reason is not justifiable. Careful preservation of room temperature and air moisture is important until all products of inflammation are thrown off as evidenced by the tube secretion. A low proteid diet seems best. All five cases recovered but required from four to nine weeks to decanulate.

The disease is nearly afebrile, apparently non-toxic except locally and is without sequelae. One is so accustomed to associate plastic exudate formation either with diphtheria or with streptococcic infection that I wish to mention this observation seen in the pharynx, larynx, trachea and bronchi the result of staphylococcus albus infection.

All five cases gave about the same history of onset, all were tracheotomized but one, they required more than a month to decanulate, one suspected foreign body, a baby of five months, a doctor's child, suspended and bronchoscoped showed membrane in the right bronchus, recovered in nine weeks without tracheotomy. An aerophagiatic which added distress to breathing.

In all the cases staphylococcus albus was not only the predominating organism, but in four of the cases was in pure culture. We saw eight pharyngeal cases, five on the tonsils, two of the epi-pharynx plus the lateral pillars and one the lingual tonsil alone. Temperature usually 99° to 100° , none over 101° at any time. Two of the cases had no antitoxin and these progressed to recovery as did those who had antitoxin and without sequelae.

For the last three years I have seen from time to time cases of intrinsic carcinoma of the larynx with a marked metastasis in the lung. The importance of this you will readily recognize, in determining upon operative interference in the larynx, the secondary metastasis in the lung would naturally contra-indicate any such procedure. I have seen five of these instances.

If the tumor in the larynx is the primary focus it would seem that the progress would be by way of the lymphatics outside of the trachea, though in this connection in none of the cases was there any palpable glandular enlargement and this may be expected for from Strauss' article the intimate lymphatics of the trachea. Transactions A.L.R. and O. Society, 1922, the progress is in the deep fascial planes of the neck and along the great vessels. All of the cases observed except one, the lung metastasis was in the upper lobe

or an area reached by such a route, in the fifth the lower lobe of the right lung away from the bronchus was the seat. If the lung is the primary focus then I see no explanation for the larynx lesion unless it be a separate focus.

Since my first observation I have made it routine to X-ray and have a careful physical examination of all chests in cases of intrinsic carcinoma. Syphilis was excluded by Wassermann and a check by second laboratory, repeated sputum examination and therapeutic test, the larynx tumor was diagnosed not only by inspection and palpation but by microscopic section as well. All of the cases died from pulmonary lesion, the larynx tumor showing no marked disposition to grow sufficiently large to demand tracheotomy. The observation may explain some of the deaths from what is called post-operative pneumonia or early recurrence in what would seem a clean dissection wide of the original tumor, or subsequent involvement of the esophagus as occurred in one of my cases that stimulated this observation.

Portion of pinion with cog attached from a watch which had been in the lung for a year and two days produced a general suppurative pulmonitis plus an empyema. Bronchoscopy under general anesthesia, etheline, oxygen and ether, bronchoscope entered small abscess cavity, it was necessary to drain off by suction one pint of pus, this coming into the small cavity from every direction, before cavity became dry enough to see foreign body which was removed easily. Postural drainage, elevation of foot of bed thirty inches produced good drainage. Second bronchoscopy showed cavity and upper lobe somewhat clearer but septic symptoms continued, draining at this time about one-half pint. Resection of rib drained little more than a pint at the time and continued for about three weeks. Lung cleared, empyema cavity closed and in three months case was discharged well.

Collar button in lung four years. Bronchoscopy showed lower main bronchus entirely closed over with scar tissue. With knife forward cutting and side biting double curette forceps, dissection through three-quarters of an inch of the bronchus to button which was removed. Scar tissue was bitten away to open lumen of bronchi surface cauterized with solution acid nitrate of mercury, prevented stricture, lower lung being restored to complete function.

Tobacco star in esophagus for six years, child, six and a half years old; was removed by cutting overlying scar tissue of esophagus where tag was completely buried. The tag had been completely encysted, child never able to eat solid food. After dissection tag was removed, cavity converted into open wound, surface cauterized with 20 per cent silver nitrate and bougies passed a few times for dilation wrought function back to normal.

Ball bearing ball swallowed by a little girl who has partially recovered from lye stricture. Six years previously lye had been swallowed, three strictures of the esophagus resulted, one below cricoid, one at crossing of bronchus, third above cardia. Upper one dilated nearly complete, second not large enough to pass 6 m.m. Killian tube, third contracted to size of small slate pencil, 16 French catheter. Ball from Ford car was stopped at lower stricture. First stricture permitted passage of tube, second stricture has to be cut like spokes of cart wheel and dilated with Mosher dilator reached ball which was removed with a wire bent like a crescent, using lower end of tube to fix the ball, the wire being passed down the esophagus, outside of the tube a small jutti tube was passed through the stricture into the stomach. This remained one week; it was replaced by a larger caliber for two weeks, after which time periodic dilation brought about sufficiently large lumen to permit solid food for first time since the lye was swallowed.

This method of the passage of a small tube over a wire through a tight stricture is giving me the best results. The esophagus will not apparently resent the presence of the tube even should it stay weeks. The small tube is brought out through the nose and is not uncomfortable. The rubber softens the stricture perceptibly and will permit caloric feeding to bring the child to a high point of resistance.

Any stricture which is permeable can usually be dilated at the first sitting to the point sufficiently large to introduce the tube and once in place nourishment sufficient to regain lost strength can be had without delay. This has saved the necessity for gastrostomy. Any case that can swallow a string can be handled in this manner. I have never seen yet the necessity for the string and the gastrostomy only where no road leads to the stomach through the esophagus. I have not yet succeeded in re-establishing a lumen in a complete stricture of the esophagus where the tube is completely closed for an inch or more. Two of these cases are on hand at present. Have you any suggestions?

Our legislature is in session at the present time with the lye bill to come up, the machinery is in full motion at the present time and with every assurance of its passage. I had hoped to bring to you the news of its passage but since work only started on May 12 I fear the time is too short.

It seems certain that under the guidance of the Chairman of the Committee on Lye legislation appointed by the American Medical Association and with the campaign he is waging in all quarters we will have a national law upon the books before very long. Another evidence of the wonderful work of our inimitable Jackson.

632 Maison Blanche Bldg.

FOREIGN BODIES IN AIR PASSAGES AND ESOPHAGUS. REVIEW OF CASES IN HISTORY AND LITERATURE.*

DR. ELLEN J. PATTERSON, Pittsburgh, Pa.

Considering the relative frequency of foreign body accidents recorded in the daily news of the present day, it seems that the rarity of record of such accidents in historical and other literature must be due to many of the cases having been overlooked in the past as they undoubtedly are today. Doubtless the absence of the journalist constantly on the alert for the sensational explains the failure to record such accidents as were known.

The author has not made an exhaustive search but a goodly number of cases have been found recorded in the literature available.

Animals are not immune to this accident as everyone familiar with his Aesop of the 6th Century will recall in the plight of "the greedy wolf with the bone stuck crosswise in his throat so that he could not eat a thing" and his hurry to reach the crane, whom he promised to reward handsomely if he would pull the bone out.

History: In Book Three of "Light of Asia", by Edward Arnold¹, being "The Life and Teaching of Gautama, Prince of India and Founder of Buddhism", the following passage occurs:

"Then came—who knows—some gust of jungle wind,
A stumble on the path, a taint in the tank,
A snake's nip, half a span of angry steel,
A chill, a fishbone, or a falling tile,
And life was over and the man is dead."

The legend of St. Blazius², bishop of Sebaste in Cappadocia and patron saint of all who suffer from diseases of the throat, relates that on February 3, A. D. 289, upon his journey to his martyrdom, he met a poor woman whose only child had swallowed a fishbone, which had stuck in his throat and he was on the point of being choked. Seeing the bishop, the mother fell at his feet saying, "O, servant of Christ, have mercy upon me!" and he, being moved with compassion, laid his hand upon the throat of the child and prayed and the child was healed and he restored him to his mother.

Sennert³ reports that Pope Adrian IV died September 1, 1159, in consequence of the introduction of a fly into the air passages.

Muys⁴ reports a case in his Practical Surgery, published in 1690, of a child seven years of age who died from suffocation three weeks after inhaling a bean.

*Read before the American Bronchoscopic Society, St. Louis, May 28, 1924.

The earliest recorded case treated for foreign body is attributed to Nicholas Habicot⁵, in 1620. Habicot, though something of a charlatan, performed tracheotomy successfully to relieve suffocation due to pressure on the trachea by nine pistoles, wrapped in cloth, swallowed by a lad of fourteen, who swallowed the gold fearing he would be robbed. "Unable to extract the pistoles, Habicot pushed them with a leaden probe, into the stomach, from whence they descended into the bowels and were discharged at different times from the anus."

The first recorded case of "bronchotomy" (tracheotomy) to remove a foreign body is detailed by Verduc⁶, in his *Surgical Pathology*, published in Amsterdam, in 1717. The patient had inhaled a fragment of bone, which was extracted from the trachea by cutting between two of its rings.

It is a curious fact that the record of one of the earliest foreign body cases is attributed to the greatest English architect, Sir Christopher Wren, in 1678, and that one of the greatest English engineers was himself a victim of foreign body in the respiratory tract, in 1843.

During the eighteenth and nineteenth centuries facts were accumulating and we find in authors much more precise notions with regard to the symptoms of foreign bodies in the air passages and to the necessity of relieving them by a measure which is equally energetic and rapid.

The first record of a foreign body problem studied out on the manikin is related by Stephen Paget⁷, 1897. He states, "I had the privilege of helping Dr. Thomas Smith in the case recorded by him and Dr. Cheadle in the *Transactions of the Medico Chirurgical Society* for 1888; the obstruction was a metal pencil cap. It was probable that the cap had gone down into the bronchus head foremost. From the physical signs the pencil cap was exactly localized. A preparation was made of the lungs and trachea from the dead body with a similar obstacle put inside them. The one right way of grasping the intruder was carefully thought out beforehand, and the operation was as accurate as the reasoning that settled the exact method of it and was at once successful."

Killian⁸ is said to have been the first to have removed a bone from the larynx by the Kirstein method.

Character of Foreign Body: Poulet⁹ remarks that "upon glancing over a collection of three or four hundred cases like that made by Bourdillat, we are struck by the relative frequency of certain objects. Thus among three hundred cases collected by Bourdillat, in seventy-one the foreign body was a bean. Shells or fruit stones have been observed thirty-six times; pieces of bone in twenty cases; various

grains, corn, coffee and melon in fifteen cases. Finally we must also mention in the following order of frequency vegetable spikelets, small pebbles, teeth, fishbones, needles and nails."

Williams¹⁰, in 1845, reports "the number of foreign bodies which may accidentally enter the air passages is very great—amongst the most common we may mention beans, pebbles, teeth, tacks, fragments of bones and morsels of food."

Tracheotomy tubes were removed from the bronchi with long forceps in four case in Guy's Hospital, London, in 1868¹¹-1876; one of which was a flexible India rubber tube¹² and the others, silver^{13 14}.

J. R. Weist¹⁵ reports in a study of a thousand cases that "the foreign body that most frequently finds a lodgment in the air passages is a grain of corn (maize)—177 examples are presented. In 109 cases, a watermelon seed (*cucumis citrullus*) was the extraneous substance. In 90 cases the foreign body was a bean. In 59 cases a grain of coffee was lodged in the air passages. In 26 cases the foreign body was a cocklebur."

In 1853, Dr. A. H. Thompson¹⁶ observed an instance in a child, one year of age, who coughed up half a peanut eight months after the accident.

Morell Mackenzie¹⁷ reports a case occurring in 1847, where "a little boy, finding his mother asleep with her mouth open, ingeniously introduced a fish-hook attached to a line. The mother, suddenly awakening, involuntarily swallowed the hook, which, after passing several inches down, penetrated the gullet." And a case in 1848¹⁸, where "a boatman's children, aged five and four years respectively, agreed to 'play at fishing', the elder persuading the younger to take the part of 'fish'. The hook was baited with a tempting morsel and the younger boy, having played round it for some time after the manner of fishes, seized it with his mouth and swallowed it. The youthful angler at once dexterously jerked the line and hooked the 'fish' near the lower end of the gullet."

Time of Soujourn of Foreign Body: Williams¹⁹, 1845, reports "Cases are on record of foreign bodies remaining in the air passages from a few months to one, two or even seventeen years." M. Roger Collard, a French physician, has mentioned a case of an insane person in whose bronchus a nail was found at the end of six years.

A case is reported as occurring in the practice of Dr. Luther Ticknor²⁰, in Salisbury, Conn., of a man, 63 years of age, who coughed up a piece of bone, November 15, 1845, from some part of the bronchial tree which he had aspirated at the age of 3 years, the bone having been in the lung for 60 years.

Dr. John Houston²¹, 1831, reports a case where a second molar tooth dropped into the larynx during extraction and was found in the right bronchus at autopsy eleven days after the accident.

Dr. Gibson²², 1831, reports a case of aspiration of a portion of chicken bone during dinner with violent cough. "Acute symptoms subsided for five weeks when the patient developed fever; violent cough in the erect position; hectic; purulent expectoration and fetor of breath. At death three months after the accident the bone was found in the right bronchus. The bronchial tube communicated with a large abscess containing about twenty ounces of pus and occupying the right lung."

Dr. Craige²³, 1834, reports a case of aspiration of an artificial tooth with expectoration of the tooth after two years, but the patient had haemoptesis and died with symptoms of phthisis.

Dr. Lettsom²⁴, 1817, reports a case of aspiration of a button with urgent cough, hoarseness, dyspnea, expectoration of dense mucus, night sweats, and emaciation. The button was expectorated after seven months with recovery.

Dr. Howship²⁵, 1816, reports a case of aspiration of an iron nail with sudden and incessant irritation, pain and cough; mucus and bloody expectoration, wasting, fixed pain in the right lung confined to a point and frequent hemoptysis. After nearly four months, during a violent fit of coughing, with copious hemoptysis, the nail was driven into the cavity of the mouth. The patient recovered, but for many years was subject to cough, with slight hemoptysis and pain in the old situation.

Alterations of Foreign Bodies: Gross²⁶ says that "when a foreign body is long retained it not unfrequently becomes incrustated with various kinds of matter. The investing matter may be merely inspired mucus, or it may consist partly of mucus and partly of lymph, or lymph alone, or earthly substance, principally carbonate and phosphate of lime, cemented by a little animal matter." This is illustrated by a case related in the *Ephemeridus due Curieux de la Nature*²⁷ of "an elderly monk, whilst eating a cherry, was suddenly called to his religious duties; the cherry stone slipped into the trachea, producing violent cough and great efforts at vomiting, of which he was near dying. A sleep of some hours succeeded to this terrible agitation, and the patient felt no more ill effects for a whole year. At the end of this time he was attacked by cough, accompanied with febrile symptoms, these became more severe daily, till at length the patient rejected a stone of the size of a nutmeg. It was formed externally of a tartareous matter, to which the cherry stone served as a nucleus. A copious purulent expectora-

tion followed the expulsion of this foreign body and the patient died a few days afterwards in a state of marasmus."

A case is reported in 1758²⁸, of an inn keeper of Bradwell, Essex, who died eight years after aspirating a gold coin. Mr. Thomas of Maldon, Mr. Bridge of Southminster and Mr. Fox of Tillingham were appointed by will to take out the money. "The lungs being taken out very carefully, the piece of money was found in the left lobe, about two inches below the division of the trachea, where 'tis likely it had not stayed long, as there was no purulent matter lodged near it and that part of the lungs appeared to be sound. The piece had a considerable crust upon it. On weighing it first in air, it had gained near fourpence above the original value, but on weighing it in water it weighed near threepence less than its original value."

Gross²⁹, 1854, remarked "very absurd notions appear to be entertained by some practitioners respecting the softening power of the air passages in this accident. The softening process is sometimes carried so far as to break down the foreign substance or to convert it into fragments, which are afterwards ejected separately, or en masse. They really seem to imagine that any substance, however hard, may undergo this process. Such notions, for they are nothing else, might be dismissed with a smile, if it were not for the mischievous tendency which they are calculated to produce in the minds of the thoughtless and unwary. We might as well wait for the softening and disintegration of the Rock of Gibraltar by the waters of the Atlantic and Mediterranean, as for the softening and disintegration of a persimmon stone and a piece of gristle by the heat and moisture of the air passages."

Etiology: Williams³⁰ states "The entrance of foreign bodies in to the air passages is by no means of rare occurrence, especially in children. This accident may happen in various ways: laughing or talking vehemently when the mouth is full of food is a common mode of its occurrence. A fit of laughter, when the mouth contained a filbert; a blow upon the back of a child whilst he was eating chestnuts; the slipping of a ladder from under the feet of a man who was eating cherries at the time, are some of the means by which foreign bodies have been introduced into the larynx and trachea."

In 1784, Gautier³¹ reports a case of a farmer of Brandeau, who, while fishing, attempted to hold a small fish in his teeth. The fish became disengaged, suddenly gliding into the larynx and the man died of suffocation two hours later. In 1873, W. Pugin Thonton³² reports that "native fishermen of Madras have a practice of holding

in their mouths the fish which they have last caught while they bait their hooks afresh. One of them was doing so when the fish jumped down his throat and stuck there. The bystanders could not withdraw it on account of the prickles on its back and as no medical man was near to open his windpipe the man was suffocated."

Gross²³ remarks that "the glottis, although by far the most common, is not the only avenue by which foreign bodies may reach the windpipe; occasionally they enter the tube from without, either by penetrating the skin and muscles of the neck or by gaining ingress through an artificial opening, as in wounds of the throat."

As illustrative of entrance from without, Louis²⁴ cites this case. "M. de la Martiniere was called to a boy, aged nine, who, whilst amusing himself with smacking a whip, was suddenly attacked by an extreme difficulty of breathing, and in a few minutes was almost suffocated; he complained by gestures of pain in the situation of the trachea. In the course of an hour he had convulsions and breathed most laboriously; his face was tumid and violet; his eyes prominent and his extremities cold; he was senseless, and apparently moribund. M. de la Martiniere, in examining his neck externally, perceived a small wound no bigger than a flea-bite, together with a slight prominence just below the cricoid cartilage. He immediately cut down upon it and extracted a copper pin, nearly an inch and a half long, which traversed the trachea in a horizontal direction. The relief was immediate and permanent. The pin, as was ascertained after the operation, had been tied to the extremity of the lash of the child's whip, from which as he cracked it, it escaped, and buried itself in the neck and windpipe." "Foreign bodies"²⁵ sometimes enter the lungs through the walls of the chest, instead of passing into them by the more natural and common route of the air passage. In the great majority of instances, the presence of the extraneous substance leads to serious structural changes in the pulmonary tissues followed sooner or later by the death of the patient. Death is produced very much in the same manner as in ordinary phthisis; indeed, it not infrequently happens, in this case, that tubercular matter is deposited in considerable quantities in the tissues around the extraneous substance, thereby complicating the traumatic lesion, and expediting the fatal event."

A case is related by Dr. M. H. Houston²⁶ of Wheeling, Va., of a man 20 years of age "who accidentally shot himself, the contents of his gun lodging in his left side. The ball, which entered beneath the axilla between the fifth and sixth ribs, was extracted along with a piece of bone immediately after the receipt of the injury. After many months of suffering the man recovered from the effects

of the wound, but was left with a peculiar cough; his health was never good; he was emaciated and his countenance had very much the appearance of tripe. At the age of forty-five he died. A cavity, communicating with several bronchial tubes, existed in the substance of the left lung, opposite the space between the fifth and sixth ribs, at their junction with the spinal column, containing a smooth, firm substance, in shape not unlike that of a silk-worm, and consisting of a piece of coarse domestic linen, evidently the patch of a bullet, about two inches and a half in length, and two inches in width, when unrolled. The cavity was lined with a smooth, tough membrane, and communicated with several small bronchial tubes, the opening into one of which was funnel-shaped and accommodated the end of the linen roll which had thus, by its projection, kept up the cough and pulmonary irritation."

Fabricius Hildanus³⁷, an Italian anatomist and surgeon, in 1682 relates the case of a man who was stabbed in the chest with a small sword. The wound, which had been crammed, as was then the custom, with linen, gradually healed; but the patient became phthisical, and finally, at the end of three months, and when apparently nearly exhausted, threw up, in a fit of coughing, two tents, which had been allowed to pass, through carelessness, into the substance of the lung."

Pilgray³⁸, first surgeon to Henry IV, gives the particulars of a case of a soldier, who, about four months after his recovery from a gunshot wound in the chest, discharged from his windpipe a fragment of one of his own ribs; it was three fingers breadth long and of considerable thickness and the man recovered without any untoward occurrence.

Situation of Foreign Bodies: Gross³⁹, 1854, states, "The foreign body may be arrested in different portions of the windpipe, or it may remain loose, and move up and down the canal during the expulsion and introduction of the air. How many persons have perished, perhaps in an instant, and in the midst of a hearty laugh, the recital of an amusing anecdote, or the utterance of a funny joke, from the interception at the glottis of a piece of meat, a crumb of bread, a morsel of cheese or a bit of potato, without a suspicion on the part of those around of the real nature of the case!! Many a coroner's inquest has been held upon the bodies of victims of such accidents, and a verdict rendered that the person died by the visitation of God, when the actual cause of death lay quietly and unobserved at the door of the windpipe of the deceased."

"The foreign substance⁴⁰ is not often arrested in the trachea, or, if arrested it does not long remain in it. Instead of this, after having

passed the larynx, it generally, either at once, or at a very early period, descends into one of the bronchial tubes, from which, however, during a violent expiratory effort, it may be again impelled upward, not only into the trachea, but even into the larynx."

"If a bean⁴¹, pebble, or other similar substance has occasionally been found in the trachea after death, or during the operation of tracheotomy, such an event is to be regarded rather as an accidental than an ordinary occurrence. In either case, it is not, as a general rule, arrested there, but simply impelled there by the expulsive efforts of the lungs."

Mr. Goodall⁴², of Dublin, 1844, appears to be entitled to the credit of having first called attention of the profession to the part played by the septum in directing the passage of foreign substances in their descent toward the lungs.

Gross⁴³ states "that violent and indeed fatal effects are occasionally produced by the impaction of foreign bodies in the pharynx and esophagus. Two circumstances may induce these effects, namely, mechanical occlusion and spasm of the glottis. The following examples will serve to illustrate the subject. The celebrated case of Habcot, detailed in the Memoirs of the Royal Academy of France is well known to the profession. A lad, aged 14, having been told that gold when swallowed was perfectly harmless, attempted to dispose in this way of nine pistoles wrapped up in a piece of cloth in order to hide them from thieves. The packet being too large to pass the esophagus lodged in the narrow part of the pharynx, where, by its pressure upon the windpipe, it produced the most intense distress, attended with a sense of suffocation, and a livid and swollen state of the face and neck."

Fabricius Hildanus⁴⁴ refers to two similar cases. In the first an infant was strangled by the impaction of a piece of hard cake; and in the second, a man lost his life by a piece of meat accidentally arrested in the tube just behind the larynx.

Stricture of the esophagus is first mentioned by Poulet⁴⁵ in its relation to foreign body. He states, "I will also mention the case reported by Billroth, 1833⁴⁶, who performed esophagotomy in a child in whom a metallic button was arrested by a stricture, caused by the ingestion of a solution of potash a year previously. The same author also states that a cherry pit and a glass bead produced similar accidents under like conditions."

Pathological Effects of Foreign Bodies: Gross⁴⁷ states that "sometimes the foreign substance, especially when retained for any length of time, induces a deposit of tubercular matter in the tissues immediately adjoining it." In a case reported by Dr. Andressen, in the

Wochenschrift für die Gesamte Heilkunde, for 1837, both lungs were filled with tubercles and cavities. The patient, a lad, aged ten, had inhaled a prune stone, which, although it was ejected some time afterwards, caused death in a little more than three months from the time of the accident.

Gibson⁴⁸, in 1850, in his *Practice of Surgery*, states that "when, during the act of deglutition, particles of food descend into the trachea, incessant irritation is kept up and although the patient, even under these circumstances, may survive for weeks, months or years, yet, in the end, unless relieved by operation, he is almost sure to die from effusion into the cells of the lungs or from phthisis pulmonalis."

SYMPTOMATOLOGY.

Rattling: Poulet⁴⁹ states that "One of the symptoms which is very often observed of movable foreign bodies in the trachea is the chattering noise (synonym: bruit of the flapping sail, bruit of the standard) to which Dupuytren has attached his name, although it had been known for a long time and was especially mentioned by Twinger⁵⁰. The view, that this sound is caused by the friction of the foreign body against the walls of the canal, is sustained by the fact, that, when the hand is applied to the neck, a slight characteristic vibration is felt, to the diagnostic value of which Dupuytren has justly called attention." Dupuytren⁵¹, 1836, stated in a lecture on clinical surgery "as regards the diagnosis of foreign bodies in the trachea, there is a sign which I deem as characteristic of the presence of those bodies, it is the sensation of their striking against the sides of the canal, which may be readily perceived both by the hand and the ear (a species of rattling, *greloiment*, very easily distinguished by applying the ear above the sternum). It does not always exist very distinctly, in all subjects, nor at all times in the same subject. Indeed it may adhere, and then not being displaced by the air, it does not strike against the parietes of the tube, or else, being thickly coated with mucus, the sound produced is less clear than under other circumstances."

Boyer⁵² mentions the case of a young child who swallowed a glass bead; by applying the hand to the throat, the motion of the bead in the air-tube was perceptible.

Atlee⁵³, 1826, reports a case of a lad of 10 years, who, after aspirating a button mold, complained of uneasiness during respiration, attended with a slight rattling. Upon coughing a rattling was heard and soon after a sudden check to expiration denoted the lodgment of the button against the lower surface of the glottis

which required a sudden and violent effort of inspiration to remove the sense of suffocation.

Cough: Gross⁵⁴ observes that "the character of the cough is usually spasmodic, that is, sudden, short, and uncontrollable, lasting from a few seconds to an hour or even several hours. The sound produced by coughing is sometimes peculiar resembling the sudden and violent click of a valve, giving one the idea of a large globule of mucus being very suddenly stopped in its progress upward by the closing of the rima of the glottis. The cough is occasionally influenced by the patient's posture, as in a case narrated by Dr. Jewett⁵⁵, of St. Johnsbury, Vt., the patient, a child, three years old, lay constantly on the right side with his head elevated by pillows.

Mr. McNamara⁵⁶, 1838, narrates the case of a boy who had accidentally got a plum stone into the trachea. "He was instantly seized with a fit of suffocation, attended by violent coughing, and expectoration of red, frothy blood." These ceased after a little time when the boy played about as usual and seemed perfectly well, with the exception of being attacked every hour, or hour and a half, with fits of coughing and hoarseness. "These fits of suffocative cough were so peculiar that they could not be mistaken; during a paroxysm his countenance became purple; his cheeks were forced out, his chest raised, and his neck swollen, in consequence of his efforts at expiration; in short, he was in the condition of a person who could fill the lungs with air without having the power of expelling it." "Nor was this difficulty of expiration the result of the contraction of the muscles of the larynx; for whenever a paroxysm was severe, I could distinctly perceive that there was a mechanical obstruction to the exit of the air produced by the ascent of the foreign body to the larynx, causing a perfectly audible sound, which resembled more that produced by striking the tongue forcibly against the anterior part of the hard palate when the mouth is closed."

Pumonary Emphysema: This symptom was noted for the first time by Louis⁵⁷ in an observation, which is celebrated, because it is one of the first well observed cases of foreign body in the air passages, and in which the indications for active treatment, which was unfortunately negatived by the timidity or ignorance of the consultants, had been clearly defined. It deferred to a little girl, seven years old, who had swallowed a dry kidney bean, which had fallen into the air passages. In addition to other symptoms, well marked emphysema appeared from the second day, upon both sides of the neck above each clavicle, a symptom which had not existed two hours previously. At autopsy Louis found that not only was the

air present in the cellular tissue of the neck, but that the lung and mediastinum were also emphysematous.

M. Lescure⁵⁸ gives some particulars of a case that came under his observation, in which a piece of the kernel of an apricot had fallen into the trachea. The child was immediately seized with difficulty of breathing and most violent cough, which latter symptom, however, ceased, and never again returned. There was always a hissing noise during the process of inspiration and the trachea just below the larynx swelled out in a manner that was sensible to sight and touch at every movement of expiration. The child died on the third day from constantly increasing dyspnea, without any change in the voice or the least return of the cough. The examination of the body showed that nearly half an apricot kernel was lodged in the trachea just below the cricoid cartilage; it appeared small enough to have moved freely in the trachea. The lungs were gorged with blood and emphysematous throughout their whole substance, though the emphysema had not manifested itself externally.

Tumor of Windpipe: Williams⁵⁹, 1845, states "The symptoms indicative of a foreign body having passed into the air passages are, a violent convulsive cough, with great difficulty of breathing, occurring very suddenly; there is pain somewhere along the course of the windpipe, with great anxiety and frothy pituitous expectoration. Toward the close the patient becomes agitated by convulsive movements, the face is discolored, the eyes become prominent, and wild in their expression, the veins of the forehead and neck swell; a marked tumor in the course of the windpipe, which increases in size with each expiration, is visible; emphysema appears about the clavicle, which extends over the throat, the extremities become cold, there is loss of consciousness and he dies suffocated. The emphysema is caused by the rupture of the air cells from the excessive accumulation of air in them and the smaller bronchi; the air passes into the mediastinum and from thence into the cellular tissue of the neck. Sometimes the pleura is ruptured and pneumothorax follows."

Asthma and Cardiac Symptoms: These symptoms are mentioned by Dr. John M. Nooth⁶¹, who has given an account of his own sufferings from an accident of this description. He was seized while on duty in Quebec, with an asthmatic affection which came on almost every day for some months; it consisted of pain and a sense of weight in the left side of the chest, together with some difficulty of breathing. A few months after the first seizure there came on, in addition to other symptoms, intermitting pulse and irregularity of the heart's action. He was persuaded to return to England, and two years from the commencement of the series of asthmatic at-

tacks he arrived in London. Soon after his arrival he went to the theater, the house was crowded and very hot; his cough became unusually severe, his respirations difficult, and the irregularity of the heart's action much greater than ever. Under these circumstances, he went home, and retired to bed very ill and in great distress. Lying with his face downward he continued coughing and spitting phlegm and toward morning he discovered that he had spit up a large leaden shot, about an eighth of an inch in diameter. In ten or twelve days afterwards the expectoration and cough had quite ceased, and the pulse had become regular. Dr. Nooth could not be certain how this shot got into the air passages, but he remembered that he was one day seized immediately after drinking the last glass of a bottle of wine, with a convulsive cough, which continued to be troublesome for some days after and this was previous to his experiencing any uneasiness in the chest.

Diagnosis: Ryland⁶¹, in 1838, says "the diagnosis of this accident claims the most minute attention, and we must avail ourselves of every circumstance at all calculated to throw light upon the subject. The symptoms should be minutely examined with reference to making a distinction between this affection and acute laryngitis, croup, or a foreign body of large size in the esophagus. From the two first it may be distinguished by the absence of fever at first, by the very sudden manner in which the symptoms come on, by the intermissions in the difficulty of breathing, which sometimes continue for an hour or two, by the noise occasionally heard when the foreign body is impelled against the vocal cords, by the excessive violence of the cough after this occurrence, and most particularly by the chief difficulty of breathing being during the time that the expiratory process is going on, whilst in laryngitis the difficulty is in the act of inspiration. From a portion of food or other substance of large size lodging in the pharynx or esophagus, as in Habicot's case, mentioned by Louis, where suffocation may be known by the facility with which deglutition is accomplished; nevertheless it may be well when there is any doubt in the mind of the surgeon, to pass a probang down the esophagus, according to the recommendation of Mr. Samuel Cooper⁶²."

Physical Signs: Ryland⁶³, 1838, states that "When a foreign substance is supposed to have located itself in either of the bronchi, the stethoscope will afford valuable assistance by enabling us to ascertain if one of the lungs or any considerable portion of it, is impervious to air during respiration. The use of this instrument and a most minute examination into the details of the history of the case are, I fear, the chief circumstances upon which we can hope

to found our diagnosis, and they unfortunately afford but very doubtful evidence. The existence of a dull fixed pain on one side of the chest more than the other, together with the indications that auscultation and percussion are capable of giving would be sufficient to decide in which of the bronchi the foreign body was situated, if from other circumstances, we had come to the conclusion that this accident had occurred."

Flint⁶⁴, 1866, states "In auscultation of both the windpipe and the chest, much difficulty will be likely to be experienced in children, from their resistance, and the restlessness occasioned by their distress. Prof. Gross suggests that to secure a satisfactory exploration, chloroform may with propriety be employed. The objections to this measure, if there be any, are yet to be ascertained, by experience."

"A dry rale may be produced at the point of lodgment of the foreign body, which may present either the sonorous or sibilant character. This sign was observed in several of the cases analyzed by Prof. Gross. The sound described by different observers as whizzing, whistling, cooing, whiffing, puffing and snoring. These terms, with the exception of the last, denote a high pitched, or sibilant rale. Diversities in the audible character are unimportant."

"The practical importance of the rale consists, first, in the fact of its existence, and second, in its being either limited to a particular part of the windpipe, or the maximum of its intensity being found at a certain point."

"A flapping or valvular sound on auscultation of the trachea and larynx has been observed in some instances, due to the movements of the foreign body to and fro in the tube, by the current of air in the respiratory acts. The shock occasioned by the impulse of the substance against the vocal cords in the acts of coughing has also been found to be distinctly appreciable by the touch, and it is in such a case that palpation may prove a valuable method of exploration. In a case reported by Bausby B. Cooper this tactile sign was so well marked in a boy who had inhaled a pebble into the windpipe, that the presence of the foreign body was predicted mainly upon it, the symptomatic phenomena being slight and an operation successfully resorted to. It is, of course, only in certain cases that this sign is available; but when present it is highly significant of a hard, movable substance like a pebble or shot within the trachea."

Paget⁶⁵, 1897, states "The symptoms and physical signs of a foreign body in the air passages are variable, but I give the signs that were noted in a case of pencil cap in the left bronchus as a good instance of the accuracy of localization that may in some of these

case be attained. It was quite clear from the physical signs that the left lung was almost completely collapsed. The retraction of the side, the absence of movement, the rising of the stomach to the level of the nipple, the displacement of the heart's apex upward and to the left showing extreme contraction of the lung together with the impaired resonance and vibration and the almost complete absence of respiratory sound were conclusive on this point. The fact that a certain amount of air passed in and out of a portion of the upper lobe seemed to prove that the pencil cap had passed to the extreme end of the left bronchus, and had, therefore, gone beyond its branch to the upper lobe of the lung."

TREATMENT.

Wright⁶⁶, quoting from Wise's work on Hindu medicine says: "If a foreign body is in the throat, the extraneous matter may be discharged by thrusting down a hot iron to dissolve it, or soften it and so remove it. In such cases the hot iron is passed through a metallic tube. A probang for removing fish bones is usual; by drinking fluids and emetics it is also dislodged; this may also be done by beating the patient upon the back of the neck."

Under the Greek writers of the Eastern Empire⁶⁷, Aetuni (Aetius) recommends the use of forceps in extracting bones and foreign bodies from the tonsils. When they were in the gullet, the patient swallowed a sponge with a string attached to it, by which it was then hauled up. For this trouble he also advises the repeated swallowing of bread boluses. It is said the following is the first mention of the Saviour in medical writings⁶⁸. "Moreover for the removal of those things which are stuck in the tonsils, immediately take a seat in front of the patient and command him to harken to thee and thou shalt say: 'Come out, bone (if indeed it is a bone or a straw, or whatever it may be), in the same way as Jesus Christ raised Lazarus from the grave, and in the same manner as Jonah came from the whale.' Then seizing the patient by the throat, exclaim, 'Blasius, the martyr and servant of Christ, says come up or go down.'"

Williams⁶⁹, 1845, says "the proper treatment of choking (that is, when a morsel of food or other substance remains in the pharynx, at the entrance of the glottis) is as follows: The remedy must be immediate. Pressure being made on the abdomen, to prevent the descent of the diaphragm, a forcible blow should be made by the flat hand on the thorax. The effect of this is to induce an effort similar to that of expiration; the larynx being closed, esophageal vomiting takes place, and the morsel is dislodged. If this plan fail, not an instant being lost, the pressure should be kept upon

the abdomen, the finger should be introduced into the throat, and the same smart and forcible blow made on the thorax as before. By the irritation of the fauces, the cardia is opened, and, by a blow made on the thorax (firm pressure being made on the abdomen) an effort similar to that of expiration, with a closed larynx, is made and a direct vomiting occurs and the morsel of food is carried away."

Sternutatories: Gross⁷⁰ states that "sternutatories of every description, mild and harsh, vegetable and mineral, have been employed, with a view of aiding the expulsion of the intruder. It is possible that this class of remedies might occasionally be beneficially conjoined with the use of chloroform. The proper plan would be to make the patient inhale the fluid until nearly insensible, and to irritate the Schneiderian membrane with snuff, or some other substance, the moment he begins to regain his consciousness. Should sneezing ensue while he is in this condition, with the air tubes in a state of perfect relaxation, it is easy to conceive that the foreign body might be ejected. Nature would be taken, as it were, by surprise."

"The thorax is sometimes suddenly and forcibly compressed, the patient having previously taken a full inspiration. The object of this manœuvre is to empty the lungs as rapidly and completely as possible in order that the air, as it rushes through the windpipe, may carry the intruder before it. The compression is usually effected with the hands, applied at opposite points of the trunk, but, perhaps a better method is to make it with a broad bandage, arranged so as to encircle the chest, and slit at the ends, after the fashion of the bandage used in tapping the abdomen. The patient, having taken in full respiration, the extremities of the bandage are suddenly drawn in opposite directions, thereby compressing the thoracic walls equally and forcibly at every point."

Inversion, or placing the patient's head downward, is a plan of treatment which probably suggested itself in the early infancy of surgery and as Gross observed, "has probably been practiced from time immemorial." It is a curious fact that the first recorded illustration of the operation is due to the greatest English architect. On January 10, 1678, Sir Christopher Wren reported to the Royal Society a case of a man, who, "swallowing a bullet down into his lungs, had been freed from the same long after by a person, who turned him with his heels upward, and shook him, and thereby making him cough, occasioned the bullet to fall back into his epiglottis and from thence by the cough to be thrown out with great violence and who had no further mischief thereby⁷¹."

Dr. Padley⁷², of Swansea, has described an excellent method by which the inversion can be effected; and he has well pointed out that when this method is adopted, the supine position favors the exit of the foreign body through the broad end of the triangular glottis being below. Dr. Padley's plan is as follows: A strong bench having been fixed with the legs of one end on a couch and the others on the floor, the patient is made to sit on the upper part of it, with his knees fixed over the end. He is then directed to lie back upon the inclined plane. Not only does the supine position, as already remarked, favor the exit of the coin, but it enables the patient by his own effort to regain the upright position by using his knees as a fulcrum and thus diminishes the danger if spasm supervenes.

Duncan's observation⁷³, reported in *The Lancet*, in 1845, is "Expulsion of a Shilling by Position". An individual was amusing himself by throwing a shilling in the air and catching it in his mouth, when the coin suddenly glided into the fauces and passed through the glottis. The accident gave rise to comparatively mild symptoms. The patient thought that he felt the coin fixed in the cricoid cartilage, and it appeared to him that he could displace it by standing on his head. As this idea coincided with Duncan's view, the shoulders were placed on a pillow, and the legs elevated. After one or two shocks, Simpson rapidly carrying the larynx at the same time from one side to the other, the shilling passed into the mouth and fell to the floor. There was no coughing spell, no indication of dyspnea, and the patient, being immediately relieved, was enchanted with the result.

Gibson⁷⁴, 1850, reports Hopkins case of a shot in the trachea, in Potters Medical Lyceum. In this case, the shot was removed from the trachea of a young lady, by her mother, who, without apprising the patient of her intention, suddenly seized her while lying over the edge of a bed and forced her head and shoulders towards the floor. The shot, being carried by this movement towards the glottis, was instantly discharged.

Dr. J. Ewing Mears⁷⁵, Philadelphia, in 1882 reports, "I recall to mind a very interesting case which was reported some years ago by a physician of Philadelphia. A boy, eleven or twelve years old, presented grave symptoms of pulmonary disease, and was rapidly declining in health. His parents, in order to give him an afternoon of recreation, took him to a pleasure garden near the city. While there he fell out of a swing, striking on his head, and there was found upon the ground at that spot a penny, which had been expelled

from the bronchus. The pulmonary symptoms disappeared and the child's health was rapidly restored."

The following highly interesting case of Mr. Brunel, the celebrated English engineer, as related by Sir Benjamin Brodie, is highly instructive⁷⁶.

"Mr. Brunel, the celebrated engineer, had several narrow escapes with his life; but the most extraordinary accident which befell him was that which occurred while one day playing with his children, and astonishing them by passing a half sovereign through his mouth out at his ear. Unfortunately, he swallowed the coin, which dropped into his windpipe. The accident occurred on April 3, 1843, and it was followed by frequent fits of coughing, and occasional uneasiness in the right side of the chest; but so slight was the disturbance of breathing that it was for some time doubted whether the coin had really fallen into the windpipe. After the laps of fifteen days, Sir Benjamin Brodie met Mr. Key in consultation, and they concurred in the opinion that most probably the half sovereign was lodged at the bottom of the right bronchus. The day after, Mr. Brunel placed himself in a prone position on his face upon some chairs, and, bending his head and neck downward, he distinctly felt the coin drop towards the glottis. A violent cough ensued, and on resuming the erect posture he felt as if the object again moved downwards into the chest. Here was an engineering difficulty, the like of which Mr. Brunel had never before encountered. The mischief was purely mechanical; a foreign body had got into his breathing apparatus, and must be removed, if at all, by some mechanical expedient. Mr. Brunel was, however, equal to the occasion. He had an apparatus constructed, consisting of a platform which moved upon a hinge in the center. Upon this he had himself strapped, and his body was then inverted in order that the coin might drop downwards by its own weight and so be expelled. At the first experiment, the coin again slipped towards the glottis, but it caused such an alarming fit of convulsive coughing and appearance of choking, that danger was apprehended, and the experiment was discontinued. Two days after, on the twenty-fifth, the operation of tracheotomy was performed by Sir Benjamin Brodie, assisted by Mr. Key, with the intention of extracting the coin by the forceps, if possible. Two attempts to do so were made without success. The introduction of the forceps into the windpipe on the second occasion was attended with so excessive a degree of irritation that it was felt the experiment could not be continued without imminent danger to life. The incision in the windpipe was, however, kept open, by means of a quill or tube, until May 13, by which time Mr. Brunel's strength

had sufficiently recovered to enable the original experiment to be repeated. He was again strapped to his apparatus; his body was inverted; his back was struck gently; and he distinctly felt the coin quit its place on the right side of his chest. The opening in the windpipe allowed him to breathe while the throat was stopped by the coin, and it thus had the effect of preventing the spasmodic action of the glottis. After a few coughs the coin dropped into his mouth. Mr. Brunel used afterwards to say that the moment when he heard the gold piece strike against his upper front teeth was, perhaps, the most exquisite in his whole life. The half sovereign had been in his windpipe for not less than six weeks.

Tracheotomy: This was advocated for three purposes; 1, to facilitate spontaneous expulsion; 2, to avoid asphyxia by glottic impaction, and, 3, to facilitate blind groping with forceps, hooks and loops, and loops.

Although Frederick Marrarius⁷⁷, in 1644, formally advised tracheotomy for the removal of foreign bodies in the air passages, and Verduc and Heister called attention in 1739 to new facts, and advised the operation, and Louis in his celebrated memoir in 1759, after presenting the facts previously published, declared himself strongly in favor of "bronchotomy" (tracheotomy) in such cases, it was not until a much later period that there was a general agreement among surgeons as to the propriety of the operation in cases of this accident. Indeed, it was only since the elaborate discussion on foreign bodies in the air passages by Prof. Gross, in 1854, that this was effected.

Prof. Gross⁷⁸ observes that "no man, however old or however great his opportunities for observation, can possibly have much experience in this branch of surgery." He also says, "Having satisfied himself that the foreign body is in the air passages, the sooner the windpipe is opened the better." "For want of this precaution," he states, "I have known a number of children lost in the vain hope that extrusion might occur spontaneously."

Myer⁷⁹ writes in his notes on Tracheotomy in the *Journal of the American Medical Association*, 1883, that "there is no security except in the early performance of tracheotomy. This opinion is fully sustained by Stokes, Neimeyer, Meigs, Bristow and Trosseau. Among the cases which have come under my observation with foreign bodies in the air passages four children perished without tracheotomy, and in these cases when death did occur after a lapse of four or five days, it was almost instantaneous. You will infer from the foregoing that I am not a believer in spontaneity. The doctrine of spontaneity has its American headquarters in the state

of Massachusetts and its capital in Boston, where nature, trusting to homeopathy, and its kindred delusions, have led to well pronounced skepticisms in the healing art. If nature is a curer, then we are imposters."

Thonton⁸⁰, 1876, states "the rule should be that unless the foreign body can be removed safely through the mouth, without fear of its slipping further down, there should be no delay in performing tracheotomy, even if the respiration is not seriously affected. There is but little hope that by waiting the substance will be coughed out. The plan of inverting the body is to be regarded as a dangerous measure, because the foreign body, as for instance, a coin, might get changed from a perpendicular to a transverse or horizontal position so that the patient would then very quickly become suffocated."

Williams⁸¹, 1845, states that "If we are satisfied that the foreign body has passed into the air tube, we should set about removing it. The foreign body may be coughed up through the glottis, but it may stick in the glottis and the patient die. Tracheotomy should be performed, and the earlier it is done the greater the chance of success. It is the complete intermission of all the symptoms, and the perfect calm which the patient often enjoys, that induce surgeons to temporize so long and postpone an operation until it is too late. It should be borne in mind that the operation is not in itself dangerous, and that the greater number of the cases which are left to nature perish."

Instrumentation: Morell Mackenzie⁸² states that "directly the windpipe is opened if the offending substance is not at once expelled it should, if possible, be seized with forceps."

Ryland⁸³, 1838, observes that "previous to the age of puberty, the size of the trachea is comparatively so small that it would be a matter of great difficulty to move a pair of forceps about in this tube with sufficient freedom for seizing a foreign body in the bronchus. The blades of the forceps should be long, slender and slightly curved; and perhaps, if the handles were placed at an obtuse angle with the blades, the grasping of the foreign body would be facilitated."

T. T. Tomson⁸⁴, 1861, cites two cases in which he removed foreign bodies from the bronchi with a piece of looped wire introduced through the tracheotomy wound and which he recommends as a simple, cheap and harmless instrument. In one case a piece of pipe-stem one and one-half inches long was impacted in the right bronchus of a lad, age 8, and in the other a grain of corn was in the right bronchus of a child about one year old.

John W. Hulke⁸⁵ observes in the *Medico-Chirurgical Transactions*, 1877, that "The difficulties attending the extraction of a foreign body from the lower part of the air passages are only fully estimated when they actually confront us. The most useful instrument in each case will principally depend on the nature of the foreign body. Forceps, to be really useful, should be light enough to serve as a sound, and also sufficiently flexible to serve as a sound, and also sufficiently flexible to allow them to be bent to any desired curve."

TREATMENT OF FOREIGN BODIES IN THE ESOPHAGUS.

Instrumentation: Gross⁸⁶, in 1829, quoting from a French writer, observes that "Before commencing the extraction of foreign bodies in the esophagus the surgeon should always carefully ascertain their nature and situation and the force with which they are retained, in order that he may be enabled to act upon them in a methodical manner."

"If the foreign body can be reached with the fingers, it should be seized with a pair of curved forceps and extracted."

"When the foreign body is situated lower down, the operator should endeavor to remove it either by means of a blunt metallic hook, a pair of esophageal forceps, a piece of silver, iron or brass wire, formed into a noose, or with a piece of whalebone, or a gum elastic catheter furnished with a stylet, and having a piece of sponge, a linen ball, or something similar attached to its lower extremity."

"If notwithstanding the most skilled management, the surgeon is unable to remove it and if it is of such a nature as not to occasion any serious inconvenience, it should by all means be pushed into the stomach. If the patient is still able to swallow fluids he should take a very large quantity at a time in order to force the substance into the stomach; or he may endeavor to force it down by swallowing a bolus of butter, thick pap, or pulpy fruits and similar substances; if the foreign body, however, completely obstructs the esophagus, it should be gently pushed into the stomach."

"If all these mechanical means have been employed without effect, we should endeavor to excite vomiting, either by titillating the palate, or by making the patient swallow, if possible, a small quantity of oil or an emetic potion or even by administering an injection of an infusion of tobacco. The same object was successfully accomplished in a man who suffered very severe symptoms in consequence of swallowing a piece of tendon which stuck fast in the esophagus, by injecting ten grains of tartar emetic into one of the veins of the arm."

"After the foreign body has been extracted, the most urgent indication is to prevent the inflammation which must necessarily result from its presence and from the attempts that have been made to remove it. Bleeding, mucilagenous drinks, and other antiphlogistic means should be immediately employed, if required by the urgency of the symptoms."

Gibson⁸⁷, in his surgery, 1850, observes that "There are several regular instruments well adapted to the removal of articles lodged in the throat, but the surgeon, if suddenly called to a patient choking, and in imminent danger of his life, should waste little time in searching for these instruments. On the contrary, he should seize upon anything that happens to be in his way, calculated to dislodge the morsel such as a horsewhip, the handle of a spoon, a rattan, etc. As a general rule, digestible articles, provided they are free from asperities, should be forced into the stomach by a probang, a whale-bone rod, having a piece of sponge fixed upon one end and a blunt hook upon the other. Copper coins and all sharp or ragged bodies, should; if possible, be extracted by gula forceps, probang hook or by a hook made of a piece of bell wire upon the spur of the occasion. It sometimes happens, however, that a foreign body can neither be gotten up nor pushed down. In that case, if it can be felt externally it may be cut upon and extracted, no matter whether upon the right or left side."

One of the most complicated cases of foreign body in the gullet is related by Adelman⁸⁸ in which a man swallowed a piece of mutton with some of the bone. Attempts at extraction with forceps and at propulsion with the sponge probang having failed, Grafe's coin catcher was tried. This instrument was passed below the foreign body, but became so tightly wedged in that it could not be withdrawn; the unfortunate patient remained with this additional foreign body in his gullet for more than two days. The coin catcher was finally loosened by means of a gum elastic catheter, which was threaded over it and when the impacted instrument had been got out, the original foreign body was pushed into the stomach. The patient succumbed about a fortnight after the first accident, but it "does not seem that the fatal result was in any way caused or accelerated by the surgical mishap."

For the removal of fish hooks⁸⁹ a leaden bullet pierced through the center was threaded along the fishing line and allowed to fall by its own weight down the esophagus till it reached the hook. The farther descent of the bullet dragged the hook downward and thus disengaged it and its barb having come in contact with the lead, both were withdrawn together. In another case a full sized

hollow esophageal bougie was threaded along the line attached to the hook till it reached the bend of the latter. Gentle pressure with the instrument set the hook free, when the line was tightened and the bougie withdrawn together with the foreign body.

Inversion: Morell Mackenzie⁹⁰, in his *Manual of Diseases of the Nose and Throat*, states that "The first recorded instance of inversion for the extraction of a foreign body impacted in the gullet is in the case of a patient who had swallowed a knife. At his own suggestion he was several times hung up by the heels in the hope that the knife might fall out by its own weight. His persevering efforts were unavailing and the knife was removed by gastrostomy.

Kneading: In a case in which the patient was threatened with asphyxia through the impaction of several large pieces of potato in the esophagus⁹¹, Dupuytren managed to pinch the gullet with his fingers through the neck, so as to crush the potato and thereby enable it to be swallowed.

In view of the fact that as early as 1854, the consensus of opinion, not only in America, but in Europe also, in the treatment of foreign body in the respiratory tract was immediate tracheotomy and removal; it is rather curious to find the following statement by F. A. Hoffman of Leipzig in Nothnagel's *Encyclopedia*, for 1902⁹², and this on the eve of the development of endoscopy.

Treatment: "The treatment depends altogether on circumstances. There is no single method that is applicable to all cases. Three courses are open to the physician: 1 operation; 2 position, with the administration of emetics to favor the expulsion of the foreign body by retching and vomiting; 3 expectant treatment. These three possible methods of treatment are not always to be used separately; a combination of them is often more advisable."

Position: "Children may be held up by the legs, and by frequent blows between the shoulder blades the foreign body may be shaken, so that the stream of air may force it out. The fear that the foreign body, on its way out, may obstruct the glottis and cause death by suffocation is only to be considered in the case of very unfavorably formed bodies and in very weak individuals, especially old people. An adult should be laid crosswise on the bed, and, with the upper part of the body hanging down and his hands resting on the floor, should be caused to cough and retch, or he may be placed in an exaggerated Trendelenburg position. One should insist that inspiration be cautious and gradual, expiration sudden and violent."

"It is advisable to supplement the above mentioned methods by the use of emetics, particularly as we have in apomorphine such a

pleasant and effective remedy. The use of other internal remedies cannot, in my judgment, be considered."

Expectant Treatment: "The third method of treatment still remains to be considered—namely, to wait and leave the course of events to nature. This course is naturally adopted very unwillingly by both layman and physician, yet it is under certain circumstances the only one, especially when the foreign body lies firmly embedded in a small branch of one of the bronchi. We may then console ourselves by the thought that the object may again become movable by inflammatory softening of the surrounding tissues, when active efforts may be made for its removal. In certain cases recovery can be expected only from the formation of an abscess and evacuation of the pus by expectoration; this applies particularly when a head of grain has gotten into the air passages; in these special cases nature is undoubtedly the best healer, if the removal is not immediately brought about."

"Among the simpler methods of treatment we find breathing with Waldenburg's apparatus recommended. The patient must, of course, be made to inspire carefully under ordinary pressure and then expire into the apparatus under negative pressure. This treatment is by no means to be despised, although I believe that it acts much too slowly and ineffectively to be applicable in ordinary cases. At times, when the physician must wait and can do nothing for a time to relieve the patient, such mild measures are invaluable. As the significance of the method is chiefly psychic, it may often be replaced by other inhalation methods or by medicinal measures."

MORTALITY.

In an elaborate and exhaustive paper on foreign bodies in the air passages read before the American Surgical Association at its session at Philadelphia, May, 1882, Dr. J. R. Weist⁹³, of Indiana, presented in tabular form the chief factor in relation to 1,000 cases collected by him from original sources, 897 never having previously been reported. Of these cases no operation was performed in 599, with 460 or 76.79 per cent recoveries, and 139 deaths, or a mortality of 23.20 per cent. In 63 cases the foreign body was removed with the forceps through the mouth with the aid of the laryngoscope. Of 388 cases in which bronchotomy was performed, 245, or 72.48 per cent recovered and 93 or 27.42 per cent perished. Among the substances spontaneously expelled were 92 cases of grains of corn with 66 recoveries and 26 deaths; 75 cases of watermelon seeds, of which 70 were saved; 51 cases of beans, with 20 recoveries; and 34 cases of coffee grains, of which 29 got well. Of 26 cases of cocklebur, 19 were expelled followed by recovery.

Of the 338 cases subjected to bronchotomy there were 85 cases of grains of corn, with 66 recoveries and 19 deaths; 34 cases of watermelon seeds with 26 successes; 39 cases of beans with 24 recoveries; 25 cases of coffee grains, of which 14 were saved and 11 cases of cocklebur of which every one got well.

His 1,000 cases gave a total of 93 deaths after tracheotomy and in no less than 73 of these the foreign body was never removed at all. In 5 of them it was spontaneously expelled through the mouth some months after the wound had closed.

In 63 out of the 1,000 it was removed by methods short of tracheotomy (forceps and frontal mirror 28, forceps alone 20, probang 2, wire hook 3, finger 8) and of the 63 only 1 died. The intruder, in these 63 cases, was in the larynx in 39, and in the trachea in 3 only; in the remaining 21 its situation was not recorded.

CONCLUSIONS.

1. The foreign body problem has practically been the same since the beginning of time, *i. e.*, how to safely rid the patient of the intruder.

2. A careful study of each case with reference to history, symptoms, physical findings, character of foreign body and problem to be met, will result in removal with greater safety to the life of the patient.

3. Blind methods of probing and bouginage for foreign bodies is unjustifiable, especially in the light of our present knowledge of endoscopy.

4. Given a foreign body in the respiratory tract or esophagus, the indications are for prompt and speedy removal and not to trust to nature to save the life of the patient.

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FOREIGN BODIES IN THE AIR AND FOOD PASSAGES; OBSERVATIONS ON A SERIES OF FIFTY CASES.*

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Foreign bodies in the air and food passages should no longer be considered as "curiosities in medicine". The numerous original observations by Chevalier Jackson and the large number of cases reported by him and his early co-workers show conclusively that foreign body accidents are of common occurrence. As a distinct clinical entity the foreign body case can be intelligently considered from the standpoint of etiology, pathology, symptomatology, diagnosis, prognosis and treatment. This should be clearly borne in mind, especially by the general practitioner of medicine, who after all is usually the first one to see the case of foreign body accident. Since early recognition and diagnosis is of such vital importance he should be familiar with the common initial symptoms and signs which attend the aspiration or swallowing of a foreign body, the proper steps which should be taken to establish a correct diagnosis, and a knowledge of the treatment indicated. There are many other phases of this subject which should be more generally and more fully understood.

Of the 50 cases embodied in this report, 20 were in the air passages, namely the larynx, trachea or bronchi, and 30 were in the food passages. Among the former, 11 were of organic or vegetable origin, including 3 peanuts, 4 kernels of corn or maize, 2 beans, 1 walnut kernel and 1 unidentified seed; the remainder were metallic in character, namely, 3 safety pins, 1 nail, 1 tack, 1 ear of toy horse, 1 lead bullet and 2 common pins. The esophageal cases included 13 coins and discs, 7 safety pins, 2 common pins, 3 bones, 3 boluses of meat or other foods, 1 pin button and 1 orthodontic appliance.

In a brief summary of the records of these cases emphasis has been laid on the following data:

1. The circumstances attending the accident and the manner in which it occurred.
2. The initial or immediate symptoms noted by the patient or by others who were present when the accident occurred.
3. Symptoms which developed after the subsidence of the initial reactions.

*From the Bronchoscopic Clinic, Jefferson Hospital.

*Read at the meeting of the American Bronchoscopic Society, St. Louis, May 28, 1924.

4. The symptoms, physical signs and Roentgen ray findings on admission to the Bronchoscopic Clinic.

5. Subsequent progress of the case.

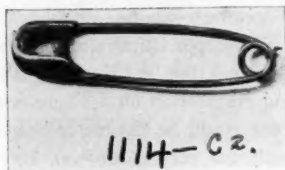
No attempt has been made to describe in detail the mechanical problems or other factors concerned in the endoscopic removal of the foreign bodies. These have been fully described in the literature.



Case 1. Child, 7 months old. While the mother was changing its napkin, the child took one of the open safety pins and put it in her mouth. There was slight choking. The mother made an unsuccessful attempt to remove the pin with her finger. On admission to the Jefferson Hospital, three days after the accident, the child was apparently comfortable and

there was no difficulty in swallowing liquid food. Roentgen ray examination showed a very widely opened safety pin in the hypopharynx with the spring end downward. At esophagoscopy the spring end was found below the level of the cricopharyngeus. The pin was removed and the patient went home well.

Comment: As shown in this case, carelessness is responsible for the occurrence of a large number of foreign body cases among children. It is interesting also to note that at the time of removal the pin was found lower than indicated by the Roentgen ray. This happens not infrequently in the esophagus. Checking up by fluoroscopy just before operation will show any change in position.

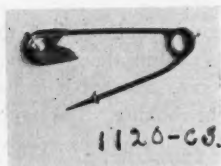


Case 2. Boy, 18 months old, came to the Bronchoscopic Clinic with a history of choking when he had a closed safety pin in his mouth two days before. The mother immediately put her finger in the child's mouth and could feel the pin but was unable to remove it. Fol-

lowing this attempt at removal he developed hoarseness and his breathing became stridorous. When admitted he was quite dyspneic, respiration was stridorous and there was marked hoarseness. There was moderate fever. The Roentgen ray report revealed a closed safety pin with the spring end in the trachea and the keeper extremity in the larynx. It was removed by direct laryngoscopy without anesthesia and the patient was discharged well.

Comment: Attempts at removal by the fingers of the parent as in this case, are usually always unattended with success. In addi-

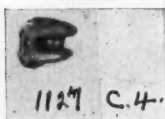
tion they are dangerous. This pin was very probably jammed into the larynx by the mother's digital manipulations as indicated by the immediate onset of laryngeal symptoms. If undisturbed it would probably have been swallowed and might have passed without difficulty.



Case 3. Girl, 4 years old, suddenly had had a choking attack with severe coughing. She stated that she had swallowed a safety pin. On admission to the Clinic two days after the accident she complained of pain on swallowing. There was a moderate croupy cough with a respiratory wheeze. The Roentgen ray showed an open safety pin, point end upward and forward in the larynx with the spring end in the trachea. By direct laryngoscopy the point was seen below the cords anteriorly with the keeper between the arytenoids. The pointed branch was disengaged with the Tucker forceps and the pin was removed with the point sheathed safely in the laryngoscope. Recovery was uneventful.

Comment: Blind attempts to push down this pin would have converted it into a tracheal foreign body. In the absence of a history of foreign body, it is easy to understand that an inferential diagnosis of laryngeal disease might have been made. A child's size laryngoscope will permit inspection of any child's larynx.

Case 4. Child, 14 months old, while playing with field corn (maize) suddenly began to cough, choke and became cyanotic. When admitted to the Bronchoscopic Clinic about three hours after the accident the temperature was 101°, pulse 128 and respiration 50. There was marked dyspnea. An asthmatoïd wheeze could be distinctly heard. With every paroxysm of coughing, which was very croupy, an audible slap and palpatory thud could be made out. Because of the characteristic signs and the urgent dyspnea it was decided to do a bronchoscopy without waiting for Roentgen ray localization. A 4 m.m. bronchoscope was introduced. An intense laryngotracheitis was present. The grain of corn was found loose in the trachea. It was removed in two minutes and fourteen seconds with the side grasping forceps. Dyspnea became progressively more marked and tracheotomy was done four and a half hours after bronchoscopy. The child made a good recovery, was decannulated and left the hospital perfectly well.



Comment: The initial symptoms of coughing and choking are indicative of laryngeal irritation and are of most important diagnostic significance. The asthmatoïd wheeze when present, as in this case, is of importance. An audible slap and a palpatory thud are the classical signs of a loose foreign body in the trachea. These are best elicited during cough. The severe constitutional and local reactions present in this case are quite characteristic of vegetable substances in the lower air passages of the very young. Tracheotomy usually becomes necessary in infants with maize, whether bronchoscopy is done or not; but in older children, say two years and older, the subglottic swelling usually subsides without the necessity of tracheotomy, if the bronchoscopy is not prolonged. It would seem needless to emphasize that maize is not a suitable toy for a child.



Case 5. Man, 22 years old, plumber, came to the Bronchoscopic Clinic because of aphagia since eating chicken meat two days before. He gave a history of accidentally swallowing a soldering compound several years previously. Esophagoscopy was done and a portion of meat removed. He was able to swallow a glassful of water immediately after. An after ray showed a narrow constriction of the middle third of the esophagus having a lumen of less than one-quarter inch in diameter. He was advised to return for treatment.

Comment: Lodging of food in the esophagus is usually suggestive of a pathologic stenosis. It is well to test out the swallowing function immediately after esophagoscopy since there may be another stricture further down with its lumen obstructed.



Case 6. Girl, 18 years old, felt a sticking sensation in her throat while eating ice cream. It was found that a brace, part of an orthodontic appliance, which she had been wearing was missing. The Roentgen ray taken at the Jefferson Hospital showed a V-shaped metallic body in the esophagus above the suprasternal notch, the apex of the V being directed downward. The brace was removed without anesthesia, using a Forbes esophageal speculum.

Comment: All forms of orthodontic appliances should be securely fastened in place. Ill fitting and defective dentures should be replaced or repaired.



Case 7. Girl, 6 years old, went to bed with an open safety pin in her mouth and early the next morning told her parents that she had swallowed it. There were no symptoms. On admission to the Bronchoscopic Clinic the day after the accident, she seemed comfortable and swallowed without difficulty or distress.

By Roentgen ray examination an open safety pin, open end down, was seen in the cervical esophagus. It was removed without difficulty and the patient went home well.

Comment: It is not always that the patient is old enough to report the accident. The absence of any distress on swallowing so often present in these cases is difficult to explain, especially with the pin point directed downward. Blind attempts to push this pin into the stomach would have been disastrous.



Case 8. Girl, 3 years old. Five days before admission she choked on a metallic disc which she had in her mouth. Since the accident she was able to take only liquid food in very small quantities. Was given medicine for four days without any improvement in the swallowing. A Roentgen ray then taken showed a disc-shaped shadow in the neck. The ray was repeated on admission to the Jefferson Hospital and showed a metallic disc

in the esophagus at the level of the suprasternal notch. It was removed by esophagoscopy and the child went home cured.

Comment: A Roentgen ray examination is indicated whenever there is a history of swallowing or aspirating of foreign body. Any disturbance in the function of the esophagus calls for Roentgen ray studies.



Case 9. Child, 13 months old, was found choking and gagging while playing with soup beans. Wheezing and stridorous breathing were noticed. When admitted to the Bronchoscopic Clinic the day following the accident the temperature was 101° F., pulse rate 142 and respiration 40. A distinct asthmatic wheeze was heard on expiration. Physical signs showed partial obstruction of the left main bronchus, which was not constant. Dr. W. F. Manges reported by Roentgen ray examination that the foreign body was in the trachea, but showed a tendency to go into the left bronchus. A 4 m.m. bronchoscope was passed and the bean was located at the carina. It was re-

moved in sixteen minutes. A marked laryngotracheitis was present. Tracheotomy, although imminent, did not become necessary and the patient left the hospital well eight days afterwards.

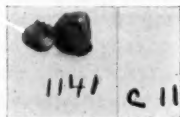
Comment: Choking and gagging followed by wheezing and stridorous breathing should immediately suggest foreign body. These symptoms, combined with a history of playing with soup beans, are conclusive. The inconstancy of the obstructive signs observed by physical examination and by Roentgen ray was due to the foreign body being so large that it could not enter the bronchial orifice. Here again a vegetable substance produced a severe reaction.



Case 10. Child, 11 months old, was found choking. The mother discovered that a safety pin was missing from one of the child's stockings. When admitted to the Bronchoscopic Clinic the following day, the child seemed well; however, she would not lie on her right side, preferring the left side. There was no dysphagia.

Roentgen ray examination showed a widely open safety pin in the oropharynx, the spring end being downward. It was removed, using an esophageal speculum, and the child was discharged well.

Comment: It is a not uncommon occurrence to hear that a very young child removed a safety pin from its clothing and subsequently swallowed it. Mothers should be cautioned about this. Other methods of securing clothing should be utilized. If pins must be used they should be so placed that they will not be readily accessible. Children with safety pins or other pointed foreign bodies often prefer to lie face downward. The posture in this case was unusual.



Case 11. Boy, 2 years old, while eating walnuts had a severe choking attack with coughing, which persisted until the following day. Four days after the accident he was sent for a Roentgen ray study to Dr.

F. F. Borzell, who made a diagnosis of non-opaque foreign body in the right main bronchus. On admission to the Jefferson Hospital there was slight fever, moderate dyspnea and an inconstant asthmatoïd wheeze. Physical signs indicated partial obstruction to the right main bronchus. There were many coarse rales present. Bronchoscopy was done, using a 5 m.m.

bronchoscope, and a portion of walnut kernel was removed from the right bronchus. The patient made an uneventful recovery.

Comment: The persistence of coughing was very probably due to the migration of the foreign body during the first 24 hours. After a foreign body becomes fixed in a bronchus coughing is not a prominent symptom unless considerable secretion is present. A foreign body knocking about usually produces violent paroxysms of coughing. The asthmatoïd wheeze is often absent when a considerable quantity of secretion is present about the foreign body. When this is removed by coughing or by shifting of the foreign body the wheeze often reappears.



Case 12. Child, 11 weeks old. While removing the baby from some blankets in which it had been wrapped, the mother accidentally dropped one of the open safety pins into the open mouth of the crying child. She immediately grasped the keeper of the pin but was afraid to pull, so let it go. There was no choking or gagging and the child was able to nurse without apparent distress. A Roentgen ray taken soon after showed an open safety pin in the esophagus point end uppermost with the spring end at the level of the clavicle. The pin was removed, using the esophageal speculum. The child returned home the next day in good condition.

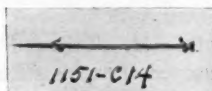
Comment: Too often we are told of accidents similar to this which are due primarily to carelessness and should be prevented. Removal of the foreign body by the finger can be done if the object has not passed beyond the base of the tongue. Indiscriminate use of the finger in the pharynx in these cases is harmful.



Case 13. Girl, 3 years old. While playing with seed corn she put some of it in her mouth and almost immediately had a sudden choking attack, followed by an expiratory wheeze with frequent paroxysms of severe coughing. When admitted to the Bronchoscopic Clinic nine days after the accident the temperature was 100° F., pulse 160 and respiration 36. A typical asthmatoïd wheeze could be heard. There was moderate dyspnea. The physical signs were those of obstruction to the right bronchus with trapping of air in the right lung. During a severe paroxysm of coughing an audible slap and palpatory thud could be elicited. Dr. Leon Solis Cohen reported by Roentgen ray examination that there was a

nonopaque foreign body in the right bronchus. With a 5 m.m. bronchoscope the foreign body was removed from the lower end of the trachea at the orifice of the right bronchus. There was a severe laryngotracheitis present, but tracheotomy did not become necessary. The patient left the hospital perfectly well in five days.

Comment: The sudden onset of the initial symptoms followed by the asthmatoïd wheeze heard best at the open mouth at the end of expiration should always suggest a foreign body in the air passages. The subsequent signs and symptoms were those of bronchial obstruction, alternating with the tracheal signs of a loose foreign body. In the presence of these findings a diagnostic bronchoscopy is indicated without Roentgen ray localization if that is not available. The Roentgen ray findings were typical of obstructive emphysema involving the right lung. Here again a severe local and constitutional reaction was noted after aspiration of an organic foreign body.



Case 14. Girl, 18 years old. When talking, while she had a common pin in her mouth, she suddenly "felt it slip into her throat and lodge on the left side". On admission 12 hours later she referred a stick-

ing sensation to the left side of the larynx. The Roentgen ray showed the pin in the larynx. With the patient in the Jackson position the pin was removed by direct laryngoscopy and the patient returned home.

Comment: The mouth should never be used as a pin cushion. Pins lodged in the larynx or pharynx usually give rise to a sharp sticking sensation. Indirect methods of removal are dangerous. There is danger of the pin being dislodged and continuing down into one of the very small bronchioles, thus converting it into an extremely difficult and dangerous problem. The patient should be placed in the position with the table steeply inclined toward the head so that if the pin becomes dislodged during manipulation it will gravitate into the pharynx, rather than uphill into the bronchi.



Case 15. Girl, 7 years old, "swallowed" a grain of corn which she had in her mouth while at school. There was severe choking with cough and a small amount of blood was expectorated. When admitted to the Clinic several hours afterwards the temperature was 100.2° F., pulse 110, respiration

34. There was no asthmatoïd wheeze or dyspnea. A slight irritative cough persisted. Physical signs elicited by Dr. McCrae were

those of typical obstructive emphysema of the entire right lung. The right chest seemed full and there was marked limitation of the respiratory movement on that side. The percussion note was hyperresonant and breath sounds were distant. The left side was practically normal. Dr. W. F. Manges reported that the Roentgen ray findings were characteristic of obstructive emphysema of the right lung. Bronchoscopy with a 6 m.m. tube was done about 6 hours after the accident and the kernel of corn was found in the right main bronchus. There was little local reaction. The patient made an uninterrupted recovery.

Comment: Here we again have the initial symptom of coughing and choking. The asthmatoïd wheeze is not always present in these cases of organic foreign body. When present it has a definite diagnostic significance. Its absence by no means negatives the presence of foreign body. The physical signs and the Roentgen ray findings of obstructive emphysema must be clearly understood to be properly interpreted. Not infrequently the uninitiated localize the pathology on the uninjured side.



Case 16. Child, 9 months old, swallowed a safety pin which he had removed from his stocking. There was immediate choking and blood stained mucus was regurgitated. A Roentgen ray examination shortly afterwards showed an open safety pin, point end down, in the hypopharynx. This was removed by direct laryngoscopy and the

patient was sent home well.

Comment: Pushing down a safety pin with the point directed downward would be disastrous. A Roentgen ray examination should be the first step towards giving the patient relief. The excited family may demand that something be done immediately. Blind methods of removal are infinitely more dangerous than leaving the foreign body in the patient. Small children not infrequently remove safety pins from their stockings.



Case 17. Boy, 3 years old, while playing with a penny, put it in his mouth, gagged, and the coin disappeared. Dr. Campbell advised immediate Roentgen ray examination. This the patient's father refused to have done, believing that the coin would pass. For five weeks there was dysphagia for solids, the patient being able to swallow only liquids. A Roentgen ray examination was finally made, which showed the coin in the esophagus at the suprasternal notch. Some periesophageal inflammation was pres-

ent. Physical examination revealed nothing abnormal. Esophagoscopy was done and the coin was removed. The patient made a good recovery.

Comment: Immediate Roentgen ray examination as advised by the physician in this case, should be done in every case of foreign body accident, as well as in every case where there is any disturbance in the normal function of the esophagus.



Case 18. Boy, 7 years old, while playing with the broken ear of a metallic toy horse suddenly "swallowed" the object. He did not choke, gag, or cough. His parents took him immediately to Dr. Thornhill, who localized the object in the right bronchus. When admitted to the Bronchoscopic Clinic two days after the accident the child appeared to be well. There was no cough, dyspnea or wheeze. The temperature was 100° F., pulse 102 and respiration 24. Examination of the chest revealed almost complete obstruction of the left bronchus. Roentgen ray showed a metallic, cone shaped foreign body in the left main bronchus. The ear was removed by bronchoscopy, using a 6 m.m. tube. There was no inflammatory reaction noted in the tracheobronchial tree. There was no postoperative reaction and the patient went home in two days perfectly well.

Comment:—While a majority of aspirated foreign bodies produce initial symptoms of laryngeal spasm, an occasional case such as this one is seen in which these symptoms are completely absent. This fact is difficult of explanation. Although the sojourn in this case was but of two days' duration it has been frequently observed that nonobstructing metallic foreign bodies may remain in a bronchus for a long time without producing symptoms. This constitutes "the symptomless interval". In this case the obstruction, with its inevitable pathologic changes, would very probably have been rendered complete by granulation tissue in a short time as there was little bronchial lumen remaining around the foreign body.



Case 19. Boy, 5 years old. While playing with a number of beans which he had in his mouth, the patient suddenly had a strangling attack and told his mother he had swallowed a bean. Paroxysmal coughing and wheezing respiration were immediately noted. When admitted to the Jefferson Hospital two days after, the wheeze was absent. There was some dyspnea. During paroxysms

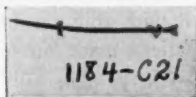
of coughing a suggestive audible slap and palpatory thud could be elicited. Many coarse rales were heard over both lungs, but there was nothing to suggest bronchial obstruction. Roentgen ray examination showed very slight evidence of obstructive emphysema of the right lung suggesting a foreign body in the trachea perhaps just at the orifice of the right main bronchus. At bronchoscopy with a 5 m.m. tube the bean was found at the mouth of the right main bronchus. There was intense swelling of the subglottic and tracheal mucosa with a considerable quantity of whitish viscid secretion. Dyspnea became gradually worse and tracheotomy was done. The patient eventually was decannulated and was discharged well.

Comment: The initial symptoms of laryngeal spasm were quite severe. This may have resulted from a prolonged lodging of the bean in the larynx. Secretion of a viscid character present in large quantity may interfere with the production of the asthmatic wheeze which was heard immediately after the onset of symptoms. A migrating foreign body, loose in the trachea, provokes frequent paroxysms of coughing and, especially if it is a vegetable substance, sets up a severe reaction in the trachea, and larynx, especially in the subglottic region. Under these conditions many coarse rales are usually heard over both lungs and signs of bronchial obstruction are obtained only when the foreign body temporarily lodges in a bronchial orifice. Beans are one of the most fatal forms of foreign bodies in the bronchi if not removed early.



Case 20. Boy, 2 years old, put a penny in his mouth and swallowed it. For six days he was able to swallow only liquid food. All solid food was regurgitated. Several physicians were consulted who advised wait-until the coin passed. He was finally referred to the Bronchoscopic Clinic where a Roentgen ray study showed the coin in the esophagus at the level of the suprasternal notch. It was removed by esophagoscopy using the small Forbes speculum. The patient had no further difficulty with solid food and left the hospital well.

Comment: Persistence of dysphagia for solids with regurgitation of food after a foreign body has been swallowed is evidence that there is esophageal obstruction and a Roentgen ray examination is indicated.



Case 21. Woman, 36 years old. While drinking milk suddenly noticed a sharp sticking sensation in her throat, which was so severe that she was forced to stop swallowing. This pain persisted and, after two days, during which time she took no food whatever, her physician was consulted. He made a mirror examination and saw a common pin in the hypopharynx. The patient had no recollection of having had a pin in her mouth at the time of the accident. At the Jefferson Hospital a Roentgen ray examination was made, which showed the pin in the right pyriform sinus. The patient was placed in the Jackson position and the pin was removed.

Comment: It is unwise to conclude that the symptoms are not due to a foreign body, because a patient has no recollection of having swallowed a foreign object. The question of foreign body should always be decided by careful study and in case of doubt endoscopy should be done.



Case 22. Boy, 7 years old, while on his way to the store to make a purchase swallowed a quarter. An attempt was made to push it down into the stomach, after which the patient vomited once. There were no further symptoms, so it was decided to wait for the coin to pass. After five days of waiting the patient was sent to the Bronchoscopic Clinic. The Roentgen ray showed the coin in the esophagus at the level of the suprasternal notch. Esophagoscopy was done with a 7 m.m. tube and the coin thus removed. The patient was discharged well.

Comment: Ill advised attempts to push down a foreign body should always be discouraged as not only ineffectual but dangerous and often fatal.



Case 23. Man, 44 years old, while eating chicken felt a sharp sticking pain in the throat. For five days he had constant pain in the chest, which he referred to the midline anteriorly opposite the second rib. The pain was made worse when swallowing. Dr. W. F. Magnes by Roentgen ray examination localized a foreign body in the esophagus about the level of the tracheal bifurcation. Barium mixture outlined the foreign body and a barium filled capsule lodged tempor-

arily at this point. On esophagoscopy a bone was found transfixed across the esophageal lumen. It was removed with rotation forceps, using a 9 m.m. esophagoscope. The patient made an uneventful recovery.

Comment: Bones are not properly considered a food. Greater care should be exercised in eating, and in the preparation of foods. Bones are more often swallowed by those who eat hastily or those who wear artificial dentures. Small fragments of bone lodged in the esophagus will not cast a shadow on the Roentgen ray film.

With the aid of a radio-opaque mixture and a barium or bismuth filled capsule an obstruction to the esophageal lumen can be demonstrated by the Roentgenologist; in addition the capsule will often show the foreign body in silhouette. This triangular piece of bone, a part of the breastbone of a chicken, is the one most commonly found as a foreign body in the esophagus.



Case 24. Boy, 3 years old, swallowed a quarter which he found lying on a table. There was immediate dysphagia for solid foods, which were regurgitated. The mother tried to remove the coin with her finger but could not feel it. After five days he was taken to his physician, who referred him to the Jefferson Hospital. With the Roentgen ray the coin was localized in the esophagus

opposite the suprasternal notch. It was removed by esophagoscopy with a 7 m.m. tube.

Comment: This case was very properly sent for Roentgen ray study as soon as he was seen by his physician. This examination is always indicated where there is a history of foreign body and especially so when there is a disturbance of the swallowing function. Too often the patient is said to vomit when it is simply regurgitation of food which did not reach the stomach but lodged above an esophageal obstruction. The broad dark band noted on the coin is a coating of sulphides and represents that part of the coin over which foods passed when swallowed.



Case 25. Boy, 5 years old, had a severe choking attack while eating peanuts. Wheezing respiration was noticed immediately afterwards. The patient was taken to Dr. W. S. Tinney, who advised an X-ray study, which was immediately made by Dr. Park P. Brenamen. The foreign body was localized in the right lung. On admission to the

Bronchoscopic Clinic four days later, there were signs of slight

obstruction to the right main bronchus. The cough was croupy. A loud wheeze could be heard during both inspiration and expiration, being louder on expiration. By Roentgen ray examination a nonopaque foreign body was localized in the right main bronchus. Shortly after, following a paroxysm of coughing, the signs of obstruction shifted to the left bronchus. In six hours the signs again became right sided. At bronchoscopy a large fragment of peanut was removed from the right main bronchus. There was no post-operative reaction and the patient returned home in good condition.

Comment: The importance of the initial symptoms of laryngeal spasm followed by the asthmatoïd wheeze cannot be overestimated. Immediate recognition of these signs with prompt physical and Roentgen ray examination lead to a positive diagnosis of nonopaque foreign body in the right bronchus. Shifting of the foreign body is seen not infrequently. This may occur as a simple change of position in the bronchus with some changes in the physical signs or the foreign body may be coughed up into the trachea and re-aspirated into the opposite lung.



Case 26. Boy, 12 years old, put a pin button in his mouth to prevent his brother from getting it. While running, he swallowed it. There were no immediate symptoms of gagging, choking or coughing; however, he complained of pain in the upper chest. On admission to the Bronchoscopic Clinic five hours after the accident, he was comfortable and the pain had subsided. No attempt had been made to swallow food or liquids. The Roentgen ray showed the button, point upward, in the esophagus at the crossing of the left bronchus. At esophagoscopy the point was found imbedded in the posterior esophageal wall. It was disengaged and removed with a rotation forceps, using a 7 m.m. esophagoscope. Recovery was complete.

Comment: Here again there is an absence of initial symptoms of gagging or choking when swallowing quite a large button. The presence of pain or an aching sensation is often noted in case of lodgment of an irregular or pointed foreign body. Although suggestive when present, these signs are not conclusive, nor is their absence of value negatively.



Case 27. Boy, 3 years old, had severe vomiting attack after eating, at times becoming cyanotic. He was treated for "stomach trouble" over a period of six days. There was no improvement in his condition so a Roentgen ray examination was ordered. It showed a large open safety pin in the oropharynx. There was no history of the child having had a safety pin nor was

there a pin missing from the clothing. He was referred to the Bronchoscopic Clinic seven days after the accident. The position of the pin was verified by Roentgen ray and it was removed, using rotation forceps. There was no further regurgitation and the patient swallowed normally.

Comment: In this case the vomiting was unquestionably regurgitation of food which was being swallowed with difficulty. The symptoms of so-called stomach trouble disappeared when the foreign body was removed. Distinction should be made between vomiting and regurgitation. The latter is primarily a sign of esophageal obstruction and the cause can usually be discovered by Roentgen ray examination. Early ray study will often clear up an otherwise baffling case.



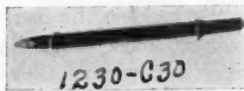
Case 28. Man, 24 years old, while eating bean-and-potato cake, suddenly found he was unable to swallow. Because of a cicatricial stricture of the esophagus he had previously had similar accidents. Believing that the food would soon pass on he waited for two days before coming to the Bronchoscopic Clinic. Esophagoscopy was done and two beans were removed from the strictured orifice. He was able to drink a glassful of water before leaving the table.

Comment: Lodging of food in the esophagus usually means local pathology. In cases of cicatricial stenosis there may be multiple strictures, several of which may be plugged with food particles. Uncorking of the uppermost stricture will not influence the more distal obstruction. Swallowing a glassful of water before leaving the table will determine whether or not another esophagoscopy is necessary.



Case 29. Child, 3 months old. While being dressed, an open safety pin dropped into the child's open mouth from the front of the mother's dress. There was immediate coughing and gagging. An unsuccessful attempt was made to remove the pin with the finger. On admission to the Jefferson Hospital 36 hours afterwards, the child seemed quite comfortable. There was an occasional croupy cough. The Roentgen ray revealed the open safety pin in the larynx with the point uppermost and anterior. The pin was removed by direct laryngoscopy and the patient went home well.

Comment: It cannot be said positively that the finger introduced into the mouth in an attempt to remove the pin had anything to do with its lodging in the larynx in this case; but in such attempts the movement of the finger tips is downward and forward, sweeping towards the larynx. The child was remarkably free from symptoms, which might have lead to a negative opinion in case of a practitioner unaware of the symptomless interval so often present shortly after lodgement of a foreign body in the air passages, even in the larynx.



Case 30. Boy, 14 years old, was holding in his mouth a nail, the head of which had been removed. When laughing, the nail suddenly disappeared down his throat. A brief paroxysm of coughing and gagging immediately followed, after which the patient was free from all symptoms. When admitted to the Jefferson Hospital two days afterwards he was perfectly comfortable. There was no dyspnea, cough or wheeze. Examination of the lungs by Dr. Thomas McCrae was absolutely negative except for limitation of expansion over the lower left chest. The Roentgen ray showed a nail, about two inches long, in a branch of the left lower lobe bronchus. It was removed by fluoroscopic bronchoscopy. The patient made a perfect recovery.

Comment: The initial symptoms of coughing and gagging followed by complete freedom of all symptoms is often misleading. This is the symptomless interval which is quite commonly seen in cases of nonobstructing metallic foreign bodies. It is the delusive period of calm and many an inferential negative opinion has been given because of this fact. Especially is this true when on physical examination of the chest one finds only limitation of expansion over one side. A skillful Roentgen ray examination will determine the presence or absence of a metallic foreign body.

Case 31. Man, 20 years old, under treatment for post-typhoid cicatricial stenosis of the esophagus, reported that he was unable to swallow. While eating meat he experienced a sensation as though something had lodged in his esophagus. He was unable to dislodge it and any attempt to swallow fluids was followed by gagging and coughing, with regurgitation. Esophagoscopy was done and a large bolus of meat, poorly masticated, was removed. It had lodged in the stenosed esophageal lumen.

Comment: All foods should be properly masticated before being swallowed. This becomes imperative in cases of esophageal stenosis. In complete esophageal stenosis regurgitation of food with frequent coughing due to overflow into the larynx is commonly met with.



Case 32. Boy, 6 years old, while at school, was shelling some field corn (maize) to be used in making up mathematical figures. While holding some in his mouth he sneezed and then had a severe paroxysm of coughing and gagging. The coughing persisted and a wheezing sound was heard on breathing. A tentative diagnosis of foreign body was made and the patient was referred to the Jefferson Hospital. On admission four days after the accident, he had a croupy cough and moderate dyspnea. No wheeze could be heard at the open mouth. The physical signs of diminished expansion over the right chest with some impairment of the percussion note and distant breath sounds pointed to obstruction of the right main bronchus. By Roentgen ray examination by Dr. W. F. Manges, the foreign body was localized in the orifice of the right main bronchus, there being signs of slight obstructive emphysema on that side. The grain of corn was removed by bronchoscopy, using a 5 m.m. tube, from the right main bronchus. Recovery was complete.

Comment: Loose objects held in the mouth are often aspirated during sneezing, coughing, laughing, yawning or any other act which is often preceded, or followed, by a deep inspiration



Case 33. Child, 2 years old, while playing with a coin put it in her mouth and, when coughing, swallowed it. There was immediate gagging. She was unable to swallow solid foods and at times liquids were regurgitated. When admitted to the Jefferson Hospital one week after, she had dysphagia for solids. Roentgen ray examination revealed the coin, a nickel, in

the esophagus at the suprasternal notch. It was removed by esophagoscopy, using the small Forbes speculum.

Comment: A majority of foreign bodies which lodge in the esophagus are shown by the Roentgen ray to be at the level of the suprasternal notch.



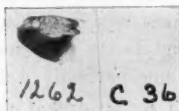
Case 34. Boy, 2 years old, promptly put into his mouth and swallowed a coin which his sister tried to take from him. There was immediate coughing and gagging, followed by dysphagia for solid foods. On admission to the Jefferson Hospital he was quite comfortable. Liquids were swallowed without difficulty. The Roentgen ray study showed a coin in the esophagus at the suprasternal notch. Removed by esophagoscopy with the small Forbes speculum.

Comment: Coins are not proper toys for children's play. It is a common practice to give the crying child a coin, button or other object, in an effort to quiet it. Such a situation too often requires some endoscopic procedure to re-establish the normal relations between toy and patient.



Case 35. Child, 18 months old, started to gag and vomit during the night. There was no history of playing with a foreign body. Frequent attacks of vomiting occurred especially after taking solid foods. After four days a Roentgen ray examination showed a coin in the esophagus. When admitted to the Bronchoscopic Clinic six days after the accident there was occasional regurgitation of food. The position of the coin was verified by Roentgen ray and it was removed by esophagoscopy.

Comment: "Vomiting" in a child occurring only immediately after the taking of food is very often regurgitation and foreign body should be ruled out by Roentgen ray study.



Case 36. Man, 19 years old. While walking in the woods put into his mouth a husk from a plant or brush. On taking a deep breath he felt the husk go into his windpipe. There was no coughing, gagging, choking or dyspnea; however, he immediately noticed a wheezing sound on breathing. Later a slight non-productive cough developed. When admitted to the Jefferson Hospital

seven weeks after the accident the temperature was normal. There was slight cough, and a typical asthmatoïd wheeze could be heard during expiration. Examination of the chest showed signs of partial obstruction to the right lower lobe bronchus. By Roentgen ray study, Dr. W. F. Manges found slight obstructive emphysema of the right lower and middle lobes which, in his opinion were produced by a non-opaque foreign body. By bronchoscopy a seed was removed from the right lower lobe bronchus. There was practically no pathology about the foreign body and the space between it and the bronchial wall was adequate for drainage.

Comment: The striking feature in this case was the asthmatoïd wheeze which developed without the frequently observed initial symptom of choking, coughing and gagging. It persisted for seven weeks and after the foreign body was removed it could no longer be heard. The absence of reaction of the bronchial mucosa to the presence of the foreign body was probably due to the patient being of adult age. In children, especially very young children, a violent reaction is usually present even if the foreign body is not obstructive.



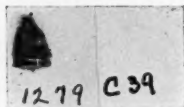
Case 37. Man, 23 years old. While attempting to fasten some of his nephew's clothing, he suddenly aspirated a pin which he held in his mouth. There was coughing and gagging immediately after the accident. Following two unsuccessful attempts at removal the patient was admitted to the Bronchoscopic Clinic four weeks after the accident. He seemed perfectly well except that there was slight cough. By physical examination, Drs. Thomas McCrae and E. H. Funk demonstrated limitation of respiratory movement with distant breath sounds over the right chest. There was some impairment on percussion over the right back. In his report of the Roentgen ray findings, Dr. W. F. Manges localized the pin in the right bronchus at the middle lobe orifice. There was also an additional faint shadow suggesting that there was some other substance present which might be attached to the pin. On bronchoscopy with an 8 m.m. tube there was found a common pin on which were threaded two small rubber spools. Examination of the chest two days after removal of the foreign body still showed some limitation of movement on the right side. The patient returned home perfectly well.

Comment: Both Dr. McCrae and Dr. Funk believed that the physical signs indicated more than a common pin in the lung. This was borne out by Dr. Manges' Roentgen ray report, and by the fact that the pin when removed had the two rubber spools attached.



Case 38. Boy, 3 years old, while playing with a nickel put it in his mouth and swallowed it. There was coughing and gagging followed by dysphagia for solid foods. After waiting nine days for the coin to be passed, he was brought to the Jefferson Hospital. Roentgen ray examination showed the coin in the esophagus opposite the suprasternal notch. The child seemed quite comfortable and there was no reaction about the neck. The coin was removed by esophagoscopy using a speculum.

Comment: A coin which passes into the stomach without lodging in the esophagus usually is passed in the stools within two or three days. A daily fluoroscopic watch on the progress of the coin is advisable.



Case 39. Girl, 4 years old, put part of a cut 22-calibre bullet in her mouth. When her sister tried to take it from her, she started to run and suddenly aspirated the bullet. There was immediate coughing and gagging. Following this she developed a "pneumonia" which became better in about two weeks although fever and a productive cough persisted. A Roentgen ray examination of the chest was then taken which showed the bullet in the right bronchus. On admission to the Jefferson Hospital one month after the accident the temperature was 104° F., pulse 120, and respiration 50. The child looked quite ill. There was no dyspnea, nor wheeze. A slightly productive cough was present. The physical signs indicated that there was complete obstruction of the right stem bronchus with some atelectasis either exudate or abscess distal to the obstruction. The Roentgen ray findings were atelectasis with exudate involving the right lower and middle lobes, the bullet being in the right stem bronchus. A fluoroscopic bronchoscopy was done using a 5 m.m. bronchoscope. The bullet was completely obscured by granulation tissue. When disturbed by the forceps a large quantity of pus welled up from below the foreign body. The bullet was removed using the forward grasping forceps. When discharged from the hospital five days after the bronchoscopy the temperature was normal. There was little change noted by Roentgen ray examination in the pathology in the right lung. The physical signs indicated that air was entering the right lower and middle lobes.

Comment: With the complete corking of the bronchus there was a very prompt reaction with probable atelectasis of the lobes distal

to the obstruction. This suggested the diagnosis of pneumonia. Later secretions accumulated in the bronchi beyond the point of obstruction, and produced the condition described by Chevalier Jackson as drowned lung. In the presence of bacteria suppuration took place in this area with the usual constitutional reactions. After a sojourn of one month's duration with complete blocking of the bronchus, the pathology was so advanced that simple uncorking of the bronchus was insufficient to re-establish the normal function of the lung tissue. Under a regimen of rest in bed, fresh air and nutritious food, literally an anti-tuberculous regimen, this patient will become perfectly well. It was interesting to note that the temperature returned to normal within twenty-four hours after the bullet was removed and remained there.



Case 40. Boy, 13 years old, while at school put two thumb tacks in his mouth. On coughing he swallowed both tacks. There was immediate choking and gagging. Roentgen rays taken shortly after showed one tack in the right stem bronchus and the other in the upper esophagus. On admission to the Bronchoscopic Clinic on the same day he had no cough, wheeze or dyspnea but complained of a sticking sensation about the neck. Examination of the chest showed slight limitation of expansion over the entire right chest with no change in breath sounds and no rales. On checking up with the fluoroscope one tack was seen in the stomach; the other in the right stem bronchus. Bronchoscopy was done and the tack was brought up into the pharynx where it was lost; the patient immediately swallowed it. Examination of the chest after removal of the tack showed no limitation of expansion. Both tacks passed within forty-eight hours and the patient went home well.

Comment: The initial symptoms were no different from those noted in cases of either aspirated or swallowed foreign bodies. It is difficult to determine from the initial choking, gagging, or coughing whether the foreign body is in the air or the food passages. Although an early Roentgen ray showed one tack in the cervical esophagus and the sharp sticking pain was still referred to this locality, a second Roentgen ray revealed the tack in the stomach. This emphasizes the need of checking up on foreign bodies immediately before operation. The complete absence of signs referable to the air passages was not unusual. The position of the tack in the bronchus with the flat surface of the head lying in contact with the bronchial wall and the shaft projecting at a right angle across the bronchial

lumen may in part account for the absence of all physical signs except limitation of expansion.



1285-C41

Case 41. Boy, 5 years old, came to the Bronchoscopic Clinic with the history that on the day before while running he swallowed a nickel which he carried in his mouth. There was immediate choking and gagging followed by some dysphagia for solid foods. A Roentgen ray examination showed the coin in the esophagus above the suprasternal notch. It

was removed by esophagoscopy.

Comment: Gagging and choking are commonly seen as immediate symptoms in esophageal foreign bodies. With dysphagia following and an absence of cough, wheeze or dyspnea the inference is that the foreign body is in the esophagus. This inferential diagnosis is often erroneous. Careful physical examination and Roentgen ray study will give definite and positive information.



1289-C42

Case 42. Woman, 37 years old, came to the Bronchoscopic Clinic complaining of pain in the upper chest which was constant, becoming worse on swallowing. Twenty-four hours before she had accidentally swallowed a piece of bone while eating soup. By fluoroscopy a bismuth filled capsule could be seen to lodge in the esophagus at the level of the mid point of the gladiolus

and remain there until dissolved. The patient referred her pain to the right border of the sternum opposite the fourth rib and to a point in the back directly posterior. A piece of bone was removed by esophagoscopy using the rotation forceps. The pain was immediately relieved and the patient went home well.

Comment: Pain when present is of variable diagnostic importance. When considered with the history and the co-existing dysphagia it is very suggestive of a foreign body. Very often it is referred to a large area in the chest wall anteriorly and to a definite point posteriorly.

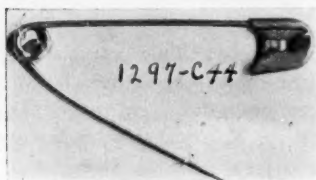


1295-C43

Case 43. Child, 11 months old, choked and gagged while eating salted peanuts. When admitted to the Jefferson Hospital on the following day, the child was quite comfortable. There was no cough or wheeze and the dyspnea was of moderate degree. Physical signs were not typical of a foreign body

obstructing a bronchus nor could signs of tracheal foreign body be elicited. Shortly after, when the patient began to cry, the dyspnea became marked; there was moderate indrawing of the periclavicular spaces and the epigastrium. Examination of the chest pointed to complete obstruction of the left bronchus. Because of the severe dyspnea which seemed to increase and the positive signs indicating bronchial obstruction, a diagnostic bronchoscopy was done without waiting for a Roentgen ray study. A large fragment of peanut, found in the left bronchus and extending across the carina to the right bronchus, was removed. Recovery was complete.

Comment: Sudden changing of the foreign body from one bronchus to the other or from a bronchus to the trachea or vice versa does occur and usually without danger to the patient. However, a large foreign body may become jammed in the glottic chink or in the trachea immediately above the carina and produce asphyxia.



Case 44. Child, 18 months old, while playing on the floor picked up a large open safety pin and put it in his mouth. There was immediate gagging and choking, followed by frequent paroxysms of coughing and vomiting. The Roentgen ray showed a large

open safety pin in the pharynx with the point upward. The pin was removed.

Comment: The floor should be kept clean if small children are allowed to crawl about.



Case 45. Girl, 2½ years old, put a nickel in her mouth and swallowed it. There was immediate choking followed by difficulty in swallowing and frequent vomiting. When taken to her physician seven days after the accident she was referred to the Jefferson Hospital. A Roentgen ray showed the coin in the esophagus at the suprasternal notch. It

was removed by esophagoscopy.

Comment: Here is another case which, in the absence of a foreign body history, might be considered as having "stomach trouble" because of the so-called vomiting.



Case 46. Man, 40 years old. While eating chicken felt a sticking sensation in his throat, which he believed was due to a bone that he had swallowed. He was unable to swallow solid foods and one week after the accident he consulted his physician, who because of the history, the dysphagia and the substernal pain, referred him to the Bronchoscopic Clinic. Under

the fluoroscope a bismuth filled capsule was seen to stop just below the suprasternal notch. The patient referred the pain on swallowing to a point along the right border of the sternum opposite the second rib. There was no pain referred to the back. A portion of the breast bone of a chicken was removed by esophagoscopy. It was found at the point indicated by the Roentgen ray.

Comment: The localization of the point of pain corresponded very accurately to the position of the foreign body. Pain is not a constant symptom of esophageal foreign body nor can its localization when present be depended upon.



Case 47. Boy, 2 years old. While eating peanuts bumped his head and had a sudden choking attack. Following this he became quite ill with fever, cough and wheezing respiration. On admission to the Bronchoscopic Clinic, three days after, the temperature was 105° F., pulse 148, respiration 30. There was a wheeze heard

on expiration. The physical signs were typical of obstructive emphysema of the right lung. There was limitation of expansion over the right chest with a hyperresonant note on percussion and distant breath sounds over the right lung. The left lung showed evidences of a compensatory emphysema. The Roentgen ray study showed increased transparency of the right lung with the heart displaced to the left and the right diaphragm low at expiration. At bronchoscopy a severe laryngotracheitis was found present. A fragment of peanut was removed from the right main bronchus. Aeration of the right lung was practically normal immediately after bronchoscopy. The child made a good recovery and went home well in three days.

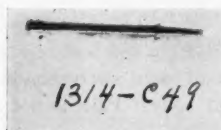
Comment: Foreign bodies are usually aspirated during the sudden inspiration of air which precedes coughing, sneezing, laughing, yawning or as in this case following a sudden surprise. The symptoms and signs, both physical and Roentgenological, from the

time of the accident to the time of operation were typical of organic foreign body.



Case 48. Girl, 6 years old, while playing, swallowed a penny which she held in her mouth. She had previously been under treatment for cicatricial stenosis of the middle third of the esophagus resulting from the accidental ingestion of lye. The coin lodged above the stenosis and was shown in that locality by the Roentgen ray. It was removed by esophagoscopy.

Comment: A penny would ordinarily pass into the stomach of a child of 6 years with a normal esophagus.



Case 49. Man, 17 years old, while holding a common pin in his mouth, laughed and suddenly felt the pin slip down his throat. He complained immediately of a sticking sensation about the larynx. A Roentgen ray taken within a few hours

after the accident showed the pin in the pharynx. The pin could be readily seen by indirect examination. With the patient in the Jackson position the pin was removed, using the direct laryngoscope.

Comment: There is always a great temptation to attempt removal with the indirect method in such a case. Unless one is especially trained in indirect manipulations the end result in such an undertaking might prove serious to the patient. Removal by the direct method with the patient in the Jackson position is a safer procedure.



Case 50. Boy, 4 years old, was given a nickel to play with. He put it in his mouth and swallowed it. The immediate symptoms were vomiting and cough. These persisted for three days so the patient was taken to Dr. C. B. Leone who referred him to the Bronchoscopic Clinic. When admitted there was regurgitation of all foods cough and slight fever. There were no chest signs elicited. The Roentgen ray showed

the coin in the esophagus at the suprasternal notch. It was removed by esophagoscopy and the patient went home well.

Comment: Tilting of a coin may completely block the esophagus and produce aphagia. Bronchial symptoms occurring in a case of esophageal foreign body may be due to overflow into the larynx

or to a tracheo-esophageal fistula. In this case there was some overflow of secretion and probably food.

CONCLUSIONS.

The personal experience in the foregoing cases along with my studies of the subjects of direct laryngoscopy, bronchoscopy and esophagoscopy lead me to the following conclusions:

1. Carelessness is the most common contributing factor in the occurrence of foreign bodies in the air and food passages.
2. Foreign body accidents are more common in the young. Of the 50 cases, 17 (34 per cent) occurred in children 2 years old or less, and 29 (58 per cent) occurred in children under 5 years of age.
3. Every case giving a history of foreign body aspiration or swallowing should be carefully investigated. Initial symptoms of choking, coughing and gagging are very suggestive of foreign body aspiration. If, while holding some foreign substance in his mouth, the patient suddenly has these symptoms of laryngeal spasm, he should be considered a foreign body case until proven negative.
4. A foreign body may be aspirated without the patient's knowledge and without immediate symptoms.
5. The asthmatoïd wheeze when present is of considerable diagnostic significance. Occurring immediately after an attack of choking and coughing, it is a very valuable sign.
6. Absence of the asthmatoïd wheeze should not negative a foreign body diagnosis. A wheeze, previously heard, may disappear for a time and then again be heard. Plugging of the bronchus by the foreign body or by thick secretions will interfere with the wheeze.
7. The asthmatoïd wheeze may not be preceded by any symptoms of foreign body aspiration. In one case (Case 36) in which there were no initial symptoms of laryngeal spasm the wheeze was distinctly heard for a period of seven weeks, or until the foreign body was removed by bronchoscopy.
8. Cough is not a prominent symptom after the initial laryngeal spasm, unless there is a considerable quantity of secretion or the foreign body is knocking about in the tracheobronchial tree.
9. The audible slap and palpatory thud are practically pathognomonic of a loose foreign body in the trachea.
10. Foreign bodies of vegetable origin, when aspirated into the air passages of young children, invariably set up an intensive laryngotracheobronchitis with a marked constitutional reaction. In older children and in adults this reaction is lacking and the pathology is usually limited to the obstructed bronchus.

11. By careful physical examination of the chest, repeated at brief intervals, a majority of foreign bodies in the air passages can be definitely localized.

12. Limitation of expansion is a very valuable sign. In the case of a pin in the bronchus this often is the only physical sign obtained.

13. Roentgen ray studies should be made in every case. The Roentgenologist can give information not only regarding the character of the foreign body and its location, but also very often can aid in the solution of mechanical problems.

14. Dysphagia occurring after swallowing a foreign body or without apparent cause, represents some disturbance in the swallowing function and the Roentgenologist should be consulted.

15. The end results of vomiting and regurgitation may have some points in common, nevertheless they are dissimilar in many respects. Regurgitation is a common symptom of esophageal foreign body; vomiting is not.

16. Removal of every case of foreign body must be considered on the basis of conditions found present at the time of operation. No one method of removal can be applied to every case.

17. Mechanical problems of removal may be complicated by the unsuspected presence of nonopaque substances about the foreign body.

18. Removal of foreign bodies should be done by direct methods. Digital manipulation, passing of a bougie or any other method which is not carried out under direct vision rarely accomplishes its purpose, and is capable of doing great harm.

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BILATERAL PEANUT KERNEL IN THE BRONCHI.*

DR. HENRY BOYLAN ORTON, Newark, N. J.

The infrequency of bilateral foreign bodies in the bronchus is probably of sufficient interest to report this unique case of aspiration of a peanut kernel, one-half of which lodged and completely blocked the left bronchus, the other half lodging and partially blocking the right bronchus.

1. This case, E. C., age 5 years, male, was admitted to the Essex County Hospital for contagious diseases on Jan. 26, 1924, as a case of laryngeal diphtheria. The illness began three days before, when the child, while playing with some other children and at the same time eating peanuts, apparently aspirated one during the excitement. The child had a choking spell, but the parents not taking into consideration the aspiration of any foreign body, thought nothing of it until the evening of that day, when their family physician was called in and 10,000 units of antitoxin was given. He diagnosed the case as one of laryngeal diphtheria.

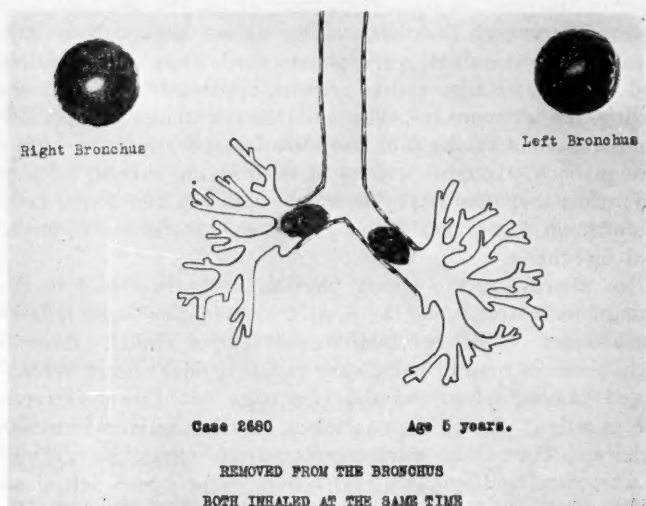
Not improving, the family physician sent the child to the contagious hospital and a general examination upon admittance was a "well nourished, well developed child". Exceedingly short of breath, pulse very rapid, regular; heart not enlarged. Liver, spleen and abdomen negative. Lower extremities negative. A culture was taken for diphtheria, which was negative. There was marked suprasternal retraction, as well as intercostal and epigastric retraction. Voice good, left chest full of râles with some dullness to percussion over the left side. The child, during the examination, became very cyanotic, with marked dilation of the alae-nasi and it became necessary to intubate, using a four to five-year tube. This was at 10:25 p. m.

The tube did not relieve the cyanosis and was coughed up. He was immediately reintubated with the same size tube, after which there was a slight relief. A few minutes later, however, the child vomited up grape skins and contents of the stomach, along with the tube. It did not seem necessary to reintubate.

The impression at that time was a left lobar pneumonia, and the child was treated accordingly. With a negative culture, the next morning, Jan. 27, Dr. Pringle suggested a foreign

*Read before the American Bronchoscopic Society, St. Louis, May 28, 1924.

body and had the child X-rayed, although the history of the foreign body was not obtained until twenty-four hours after admittance to the hospital. At 10:30 on Jan. 27, I was called in to see the case, and upon examination found, in addition to the above signs, a diminished expansion on the right with an absence of breast sounds in the left chest. With the X-ray picture, which showed an increased transparency on the left side, I made a diagnosis of a foreign body at bifurcation just within the left bronchus. The case was bronchoscoped that afternoon and I found half of a peanut kernel in the right bronchus, which was removed with peanut forceps without anesthesia in 3 minutes and 49 seconds.

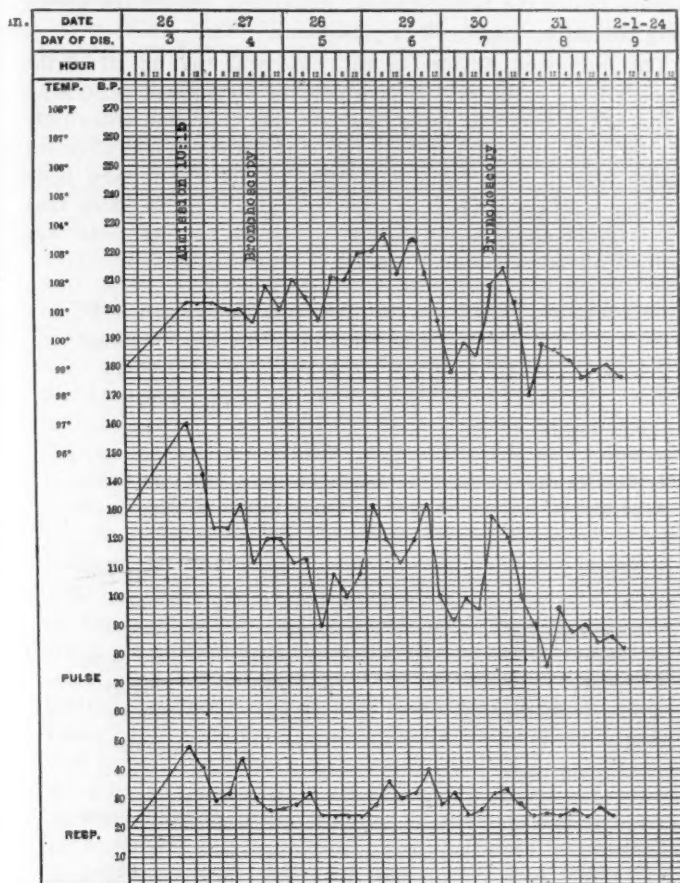


Thinking of the possibility of a large foreign body being coughed from one bronchus to the other, it was quite possible that the sounds elicited in the left side would disappear. The child breathed normally and rested comfortably after the bronchoscopy.

On Jan. 29 I was informed that the child had a pneumonia; that there was flatness below the left clavical with diminished breathing over this area and slight bronchovesicular breathing in the left axillia. Vocal fremitus diminished with a temperature of $103.3-5^{\circ}$ with no expectoration.

The case was X-rayed again, which showed a drown lung appearance on the left side. As I was of the opinion that there

was a foreign body in the left side as well, I suggested another bronchoscopy, which was done that afternoon and the other half of the peanut kernel was removed from the left bronchus without any anesthesia in 2 minutes and 50 seconds, I being



assisted at both bronchoscopies by Dr. Barkhorn and Miss Lumbreyer.

All cultures taken for diphtheria were returned negative, as well as smears for Vincent's angina. All laboratory findings are attached. The temperature chart shows the drop of temperature after the second bronchoscopy. Recovery was un-

eventful and the case was discharged from the hospital the next day, Jan. 31.

The X-ray shows the increased transparency of the left side with the heart pushed over somewhat to the right. Another picture shows the heart shadow obliterated, due to the drown lung condition, diagnosed as pneumonia.

The interesting feature of this case was that in all of the foreign body cases that I have seen in my limited experience I had not noticed the retraction that this child had when only one bronchus was obstructed, and it probably should have led me to believe that there was either a bilateral foreign body or large tracheal one. It is, however, gratifying to know that my original diagnosis of foreign body on the left side was verified by bronchoscopic removal.

Pathological Report No. 1. Name: Ernest Christian.

Urine examinations

Date:	1-28-24	1-30-24
Color	Straw	Straw
Transparency	Clear	Clear
Reaction	Acid	Acid
Specific Gravity	v.f.t.	v.f.t.
Albumin	Neg.	Neg.
Casts	None	None
Leucocytes	Present	Abundant
Pus	None	None
Erythrocytes	None	None
Epithelium	Rd. Squa.	Rd. Squa.
Cylindroids	Threads	Thread
Amorphous Sediments	Urates	None
Crystals	None	None
Micro-organisms	None	None

Blood examinations

Leucocytes (6-7-12,000)	14,800	14,400
Polynuclears (6-75%)	41%	68%
Lymphocytes (20-30%)	58%	32%
Endothel Leuc. (5%)	0	0
Eosinophiles (0.5-6%)	1%	0
Basophiles (0.5%)	0	0
Hb% ; Instrument	90%	
Erythrocytes	4,350,000	
Color Index	1.04	

In a personal communication from Dr. Jackson as to the frequency of this condition, Dr. Jackson informed me that they have had three cases in which the peanut kernel was bilateral. It is because of the uniqueness of this case that I am reporting it.

The other cases of foreign bodies in the esophagus and bronchi which I am presenting are ones that I have selected from my series of 103 cases, because each has a particular history and may possibly be of interest in bringing out certain points connected with peroral endoscopy. In reporting these cases I am not going into detail to any extent regarding the physical signs and examination.

II. The importance of avoiding finger manipulation cannot be too strongly emphasized and is readily demonstrated in the case of Mr. J. V., age 48, white, referred to me by Dr. Mann, of Perth Amboy. The patient had apparently been on a drunken spree and while eating some pork, attempted to swallow a very large bolus, which became lodged in his esophagus. Three attempts were made by various doctors to remove it by finger manipulation. The third attempt was made under ether and during the anesthesia, the patient became asphyxiated and resuscitated only after artificial respiration. A general anesthesia given for the removal of foreign bodies as large as this one, in its location, plus the trauma caused by previous manipulations, should not have been thought of, in my opinion.

At the time of my visit, I found that there was an emphysema on the right side of the neck extending from the shoulder to the angle of the jaw. The uvula was pushed over to the right side; there was marked swelling of the arytenoids and epiglottis, and breathing was very much labored, with a temperature of 103°. Without any anesthesia, an esophageal speculum was passed and behind the cricoid cartilage, extending downward in the esophagus, was found a large bolus of food, which measured four inches in length. It was removed with forceps in 3 minutes and 30 seconds. The esophagus was badly lacerated in three places from the trauma caused by finger manipulation, and certainly gives a vivid picture of what can happen by improper manipulation by men not familiar with this kind of work.

III. It is surprising how often foreign bodies in the bronchus or esophagus are mistaken for other diseases. In the case of Baby F. G., 17 months, referred to me by Dr. Liefeld,

the child, while playing around the house, had swallowed a copper rivet, which lodged in the thoracic esophagus. The parents apparently did not take into consideration the fact that the child choked and only concerned themselves with a cough which subsequently developed, and for this condition the child had been treated for two weeks for bronchitis. It was not until after two or three choking spells with expectoration and vomiting of blood that an X-ray was taken and Dr. Liefeld was called. Dr. Liefeld immediately referred the case to me.

The X-ray showed the rivet within the thorax in the esophagus, and as you can readily see, the edges of this rivet are very sharp. When I saw the case, the little child was almost moribund, having a temperature of 104° and a very rapid pulse.

At the proximal end of the rivet there was an esophageal laceration and esophagitis. The foreign body had already perforated the esophagus and because of that, it was exceedingly difficult to remove it, taking in all 35 minutes without any anesthesia. The child died twelve hours after the removal of the foreign body. This case is the only one that I have lost in my series of 103 foreign bodies, and I am sure that the death cannot be attributed to the esophagoscopy, but to the perforation of the esophagus.

IV. In the case of Mr. E. S., age 26, male, white, referred to me by Dr. Ransom, of Maplewood, N. J., here again the evidence of finger manipulation is vividly pictured. The patient (in a neighboring state) swallowed his artificial denture, which lodged in the esophagus at the entrance of the thorax. Finger manipulation had been unsuccessfully done before Dr. Ransom saw the case, who referred it to me. Three days later, when I saw the patient, I found the arytenoids were very edematous as well as the entire oro-pharynx, with a marked annular edema above the foreign body in the esophagus, which made it somewhat difficult to remove. There was no anesthesia given in this case and the time was 6 minutes.

In another case of an artificial denture lodged in the esophagus at the same point, I gave ether to get a complete relaxation of the esophagus because of the sharp points on the denture.

V. The case of B. A., age 6, had a screw in the right bronchus; the child was admitted to the Monmouth Memorial Hospital at Long Branch with fever and vomiting. This was another case of mistaken diagnosis in that the child had been

treated for four and one-half years for various chest conditions: pneumonia, empyema, pluresy, tuberculosis and abscess of the lung, and it was only after an X-ray was taken of the chest that the true cause was found. The history obtained was that about four and one-half years ago (which made the child about 1½ years old) the patient accidentally inspired a foreign body. Later the child developed a cough, productive of thin, grayish sputum, with frequent vomiting spells. The fingers were club-shaped, characteristic of lung suppuration, and upon bronchoscopy I found the right bronchus filled with pus and granulations around the screw. The foreign body was removed without anesthesia in 6 minutes and the child is perfectly well at the present time.

VI. Case of C. A., age 63, had been admitted to the same hospital for treatment for a suspected carcinoma of the larynx previously diagnosed by another physician because of the pain which radiated to the ear and a slight swelling on the external part of the neck and difficulty in swallowing, with a slight degree of hoarseness. The history obtained at the hospital was that while eating some cabbage soup prepared by his wife, the patient felt something stick in his throat which caused him to choke and vomit, and later caused an increased salivation and blood-tinged mucous. Upon examination a soft, round mass was found at the junction of the upper and lower third of the anterior border of the left sterno mastoid muscle, which mass was tender and easily movable. Later when the X-ray was taken, it showed a foreign body one and one-half inches long apparently lying crosswise in the esophagus and sticking through the lateral wall of the left side into the tissues of the neck just below the level of the larynx. This was verified by esophagoscopic removal.

Another case in which a needle figured was that of a man who had been eating some Thanksgiving turkey, when he felt something stick in his throat. An X-ray was taken and it showed the needle, which had been used in sewing up the turkey after dressing it and apparently had been left there by the cook.

VII. In the case of S. J., age 4, referred to me from Red Bank, N. J., with the history that that morning he had inhaled a cartridge shell, the physical signs revealed a blocking of the left bronchus, verified by X-rays and by bronchoscopic removal. The interesting part of this case is the value of both the postro-

anterior position and the lateral one, as in the postero-anterior position we find the cartridge apparently in a position for removal without any difficulty, but on the lateral picture, it shows that the cartridge had been crushed, which made the problem of removal entirely different. It was, however, accomplished in 4 minutes without any anesthesia and the subsequent X-ray picture, taken within ten minutes after the removal, shows both lungs aerated.

VIII. In the case of S. V., referred to me by Dr. Eagleton with the history of a glass bead in the esophagus, the physical signs revealed a partial blocking of the bronchus on the right side, but when the X-ray was taken (which does not show on this plate, however) there were two beads present, one bead in the right bronchus and the other shown high up, apparently in the esophagus. The esophagus was explored first and no foreign body seen. The right bronchus was then explored and the bead found. The mechanical problem in this case was the proper grasping of the bead, which I did with rotation forceps, one blade being passed into the opening of the bead and the other being placed over the equator, all being removed together in 6 minutes. The nurse was instructed to watch for the other glass bead by the proper examination of the stools and she reported the following morning that the youngster passed a penny but no bead. Here a cough during the X-ray picture accounted for the two positions of the bead, simulating two foreign bodies.

IX. Another case of a bead, this time a wooden one, which of course did not show in the X-ray, but the history and the physical signs showed a blocking of the left bronchus, which was verified by bronchoscopic removal in the same manner just described.

X. Case of B. K., age 55, was a most interesting one, not only from the bronchoscopic standpoint but possibly from a medico-legal one. This man had been employed in the acid room of a platinum refinery, and one day was overcome with the acid fumes. He was sent home, his physician was called and he said the man had a paralysis of the larynx, due to the fumes. He was aphonic and continued this way for several years. A cough developed later, productive, and he was raising from eight to eleven ounces of foul smelling pus every day. He was then sent away to a different climate with the idea that a change of air would clear up his chest. About a month before

being referred to me, he had severe pains throughout the chest and throat with an increased amount of discharge, so intense that the patient was unable to lie down and was instructed to lean over the foot of the bed three times a day to drain the lungs. The only relief the man had was after the administration of morphin. From July until November of last year, clear blood at various times was raised. On Nov. 5, the patient was referred to Dr. Barkhorn and he had an X-ray taken and referred the case to me for a diagnostic bronchoscopy. The physical signs were those of a lung abscess. On Nov. 14 a diagnostic bronchoscopy was done and I found that the carina was sharp and moving freely in both directions. In the right bronchus just below the middle lobe bronchus, a foreign body was seen. Right angle forceps were used and all removed together in 14 minutes. The foreign body turned out to be a vertebra of some animal (squab) and the most interesting part of the case is that no absolute history of foreign body inhalation was obtainable, and the man had been on a pension.

XI. Case of S. H., age 4, referred to me with a diagnosis of a tack in the esophagus. Upon physical examination I found that the tack was located in the right bronchus, which was verified by bronchoscopic removal in 12 minutes and 26 seconds. The interesting feature of this case was that the point had penetrated and emerged beneath the mucous membrane of the bronchus, which necessitated pushing the tack down for disengagement before removal.

XII. The largest foreign body that I have had the pleasure of removing from the esophagus was a full sized teaspoon from Miss E. D., age 47, who had been admitted to the New Jersey State Hospital for the Insane at Morris Plains because she was depressed and had suicidal tendencies. Upon her return to the hospital after visiting her home on leave, she had difficulty in swallowing solid food, with regurgitation and vomiting. A Roentgenogram, taken at the hospital, revealed a teaspoon in the esophagus, the bowl resting on the diaphragm. Further questioning of the patient by physicians elicited the information that she had swallowed the spoon four weeks prior to my visit, and three weeks before going on her leave. On Sept. 25, I was called to the hospital to attempt to remove the foreign body. The esophagoscopy was done without anesthesia other than a quarter grain of morphin and 1-150 grain of atropin given hypodermically one hour before the esopha-

gосcopy. An extra long Jackson esophageal speculum, 30 c.m., was used, which was passed down the esophagus until the handle of the spoon was seen, and with special, unusually long alligator forceps passed through the esophagoscope, the handle of the spoon was grasped and all was withdrawn together. There was no mechanical solution to solve in its removal, which was accomplished in 6 minutes from the time the tube was inserted until the spoon was on the table. As the patient was insane, some doubt was expressed as to the advisability of removing a foreign body without general anesthesia, but she was perfectly calm and the whole procedure was accomplished without any disturbance or untoward effects.

A very interesting by-feature of this case was that the hospital authorities insisted that this patient swallowed the spoon while she was on leave at her home. Unfortunately, evidence was against them because upon the removal of the spoon, the New Jersey State Hospital stamp was found on it, showing rather conclusively that it had been swallowed while she was in the hospital and not while on a visit to her home.

Another case in which I removed a button from the esophagus of an insane woman was accomplished without any untoward effects or disturbance on the part of the patient, she being classed as a violent one. I would appreciate very much knowing if any of the gentlemen present have had any undue trouble with insane patients in the removal of foreign bodies.

671 Broad Street.

PERFORATION OF THE ESOPHAGUS BY A FOREIGN BODY, WITH REPORT OF A CASE PRESENTING UNUSUAL X-RAY SIGNS.*

By SAMUEL IGLAUER and J. LOUIS RANSOHOFF, Cincinnati.

Traumatic perforation of the esophagus may be due to the presence of a foreign body, to improper attempts at extracting the intruder, to faulty technic with the esophagoscope or to wounds of the neck or thorax. When perforation occurs the mediastinum is immediately exposed to infection and unless relieved by appropriate surgical intervention death almost invariably ensues.

In a review of the 529 esophageal foreign body cases occurring in the Vienna Clinic during a ten-year period ending in 1919 Schlemmer¹ recorded fifteen deaths, thirteen of which were directly due to the foreign body and complications. As a last resort sixteen, or 3.2 per cent of all the cases were operated upon and of these seven recovered.

In 1922 H. Killian² in a very complete review of the literature since 1900 collected three hundred and eighty surgical foreign body cases, of which one hundred and sixty-nine, or 46 per cent, were operated upon on account of infection and its complications. Of these, seventy died, giving 41.4 per cent mortality. In general he found "that the mortality rises rapidly with every complication".

In the last series reported by Jackson³ in 1923 there were 204 cases of esophageal foreign body, with three deaths from septic conditions—i. e., one from septic pneumonia, and two from mediastinitis, etc. This gives the very low mortality of about 1.5 per cent.

Signs and Symptoms of Perforation—Killian's² very complete review of the literature with detail study of eighteen cases enables him to present a very clear account of perforation from which he draws definite conclusions as to the indications for operation.

A patient with a recent perforation usually appears very ill and may manifest some evidence of shock. The head and neck may be held in a fixed position to relax the muscles on the affected side. Severe pain and marked tenderness at the site of perforation are usually present and are greatly aggravated by attempts at deglutition, which at times becomes impossible. Opposite the point of perforation swelling occurs in the peri-esophageal tissue and may be due to cellulitis, abscess formation or to an interstitial emphysema from the escape of air from the esophagus into the tissues. The

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emphysema may occur slowly or with great suddenness during straining effort. If the introitus of the larynx is swollen dyspnea may ensue.

In some cases—a new X-ray sign of perforation, described in one of Killian's cases and independently observed in one of my own, gives positive evidence of perforation of the cervical esophagus. In a lateral view of the cervical region the Roentgenogram shows a marked increase in thickness of the normal narrow space between the esophagus and the vertebral column. In the midst of this swollen area a zone of decreased density, interpreted as air bubbles, i. e., emphysema, is visible and the foreign body may sometimes be observed within the air bubbles. Fig. 1. With this picture one is enabled to make an early diagnosis of emphysema before it becomes palpable in the neck.

Another positive X-ray sign is the appearance of the barium meal outside of the esophagus. This is well shown in one of Killian's cases and even better in a case recently reported by McGinnis.⁴

Finally if an esophagoscope is introduced the site of perforation may come under direct vision.

Case Report—The following case presents a typical history of a foreign body perforating the esophagus and shows the value of X-ray diagnosis of the condition as well as the advisability of prompt operative interference. The patient, a boy, 8 years old, was referred to me by Dr. Fred Lamb on Nov. 20, 1922, with the statement that on the evening of Nov. 17, while eating some rabbit meat, he felt a sharp pain in the neck just above the clavicle. The pain continued and he was taken to a nearby physician, who probed blindly, using a cotton-wrapped sound. This gave no relief and the pain continued in the supra-clavicular region. On the day following the accident large quantities of saliva drooled from the mouth, but the patient was able to swallow.

Present condition: Nov. 20, 1922. Patient holds the right shoulder up and the neck is held rigidly turned to the right. The right neck muscles are rigid and there is some induration and tenderness under the right sterno-cleido-mastoid muscle. There is pain over the sternal notch—temperature registered 100°. "X-ray films of the pharynx, larynx and the upper portion of the esophagus and trachea show the presence of a foreign body about a half inch in length situated in the upper portion of the esophagus on a plane parallel with the space between the fourth and fifth cervical vertebrae. There is seen an area of lessened density at the upper portion of the foreign body which is probably an abscess. There is also shown infiltration of the soft tissues." (Dr. C. Little.)

Esophagoscopy: On the evening of the same day under ether anesthesia a child-size Lynah esophagoscope was introduced with great difficulty, and even a smaller tube in the esophagus caused some interference with respiration from pressure. The posterior wall of the esophagus behind the cricoid was edematous and bulged forward, narrowing the lumen. No foreign body was visible but what seemed to be a slight vertical laceration about one-sixteenth inch long was noted on the posterior esophageal wall. The search for the foreign body was discontinued. Upon rereading the plate it was decided that the foreign body was outside of the esophagus in the thickened inflamed area, and that it was free in the air or



Fig. 1. Foreign body perforating the esophagus and seen lying free in an air-containing abscess cavity. Note thickening of retro-esophageal tissues.

(The bismuth capsule is arrested above the constriction.)

gas bubble pictured in the X-ray plate. (There was no subcutaneous emphysema.)

Operation: After consultation with Dr. J. Louis Ransohoff it was decided that the only way to relieve the child was by an external esophagostomy and on the following morning he performed an external operation, which he describes as follows: "Under ether anesthesia an incision was made along the anterior border of the right sternocleido-mastoid muscle, with the center at the cricoid cartilage. By dislocating the great vessels backward and the thyroid forward, the esophagus was easily identified, the identification being assisted by the introduction of a large catheter. Following the line of cleavage of the posterior wall of the esophagus, an abscess cavity was discovered.

After protecting the mediastinum by washed out iodoform gauze, the abscess cavity was opened. The foreign body was discovered free in the abscess cavity. It was a very sharp spicule of bone. No attempt was made to find or suture the esophagus, and the operation was completed by introducing a cigarette drain in the region of the abscess cavity. During the night the child got out of bed and drank water. As this seemed to do no harm, he was allowed fluids the following day, and made an uninterrupted recovery, leaving the hospital with a small granulating wound the eighth day after operation.

"This case presents several unusual features: in the first place the X-ray diagnosis of perforation of the esophagus and the presence of an abscess cavity; in the second place, contrary to the usual procedure, the incision was made on the right side of the neck. This was done because the symptoms pointed to an abscess on the right side of the esophagus. Thirdly, it refutes the statement frequently made that external esophagotomy is no longer justifiable."

Indications for Operation: The positive indications for operation are very well formulated by Killian (op. cit.) and are quoted to serve as a basis for discussion.

1. Extraction or propulsion of the foreign body found to be impossible.
2. Perforation of the esophageal wall.
3. Emphysema.
4. The combination of fever, pain, tenderness and infectious swelling due to the foreign body or trauma.
5. Dangerous hemorrhage or progressive anemia.
6. Tracheo-esophageal fistula.

The personal equation naturally enters into the question of the irremovability of a foreign body, but in any large series a few cases will be encountered in which safe removal without external operation will be impossible. To paraphrase a common expression, "Whatever has gone down will not necessarily come up". Propulsion should never be attempted without ocular guidance.

Subcutaneous emphysema gives an absolute indication for operation if it occurs spontaneously in connection with a foreign body, since these cases nearly always terminate fatally. Jackson,³ however, reports two such cases which recovered without operation. Another possible exception may be found in cases which occur after ballooning the esophagus. Dr. Mosher⁶ has informed me of one such recovery and I know of another.

The combination of fever, pain, tenderness and swelling almost always indicate perforation, but operation may be deferred for a

very brief period provided all these symptoms show a decided tendency to subside. All of these latter symptoms, including a white count of 16,000, were present in a recent case of my own but the patient recovered promptly without operation after the removal of the foreign body, accompanied by a discharge of pus into the esophagus. The following day the blood count was 10,000 and the next day 7,500.

Operation may doubtless be deferred in some cases complicated by tracheo-esophagageal fistula since the fistula may close with the employment of a permanent feeding catheter.

Choice of Operation: The choice of operation depends upon the site of the foreign body or the contiguous inflammatory area. The cervical portion of the esophagus is involved in about 60 to 90 per cent of the cases. (Killian op. cit.) In Schlemmer's¹ review 72.3 per cent of the foreign bodies were in the upper half of the esophagus.

It has been recommended by Marschick⁷ to approach the esophagus below the site of perforation and infection in order to wall off the mediastinum. The upper thoracic esophagus can also be approached from the neck. When the lesion is lower down the operation of extra pleural posterior mediastinotomy is indicated. According to Lilienthal⁸ tumors as well as infectious processes can be reached by this route.

The transpleural approach under differential pressure or insufflation anesthesia should only be considered if the pleura is involved in the infectious process.

CONCLUSIONS:

1. Serious complications requiring operation occur in about 3.2 per cent of cases of foreign body in the esophagus. (Schlemmer.)
2. The signs and symptoms of perforation are usually quite characteristic.
3. The X-ray examination alone may give positive evidence of perforation.
4. When the diagnosis of perforation has been established immediate operation is indicated.

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Pearl-Market Bank Bldg.

AN EXPERIENCE IN MEDICAL LEGISLATION.*

DR. MARSHALL TAYLOR, Jacksonville, Fla.

While presenting this subject to you, I can appreciate the feeling of the bronchoscopist who reports before a society the removal of a tack from the right main bronchus and then to his dismay finds that the essayist who follows him reports the endoscopic removal of over a thousand foreign bodies. The part played by the writer in this nation-wide effort to protect children from the tortures of strictures of the esophagus from lye is a minor one, compared to the wonderful work of many of the members of this society. However, our distinguished president has requested me to make a brief report of my experience concerning lye legislation in Florida.

First, I would like to state that it is the opinion of the writer that if any bronchoscopist would give up as much time to securing this specific legislation as he is required to give to the treatment of one case of cicatricial stenosis of the esophagus following the ingestion of lye, he could bring about this necessary law in his respective state.

After hearing Dr. Jackson's address before this Society in Atlantic City last year, in which he told of the law that had been passed in Pennsylvania and appealed for like action in other states on this legislation, I returned to my home and attended the Florida Medical Association which was then in session. There I was given an opportunity to show a number of roentgenograms of cases of cicatricial stenosis of the esophagus following the ingestion of lye, and appealed to the Association for 100 per cent co-operation in this matter of prevention. The following motion was made and unanimously carried:

"That the legislature of the state of Florida be memorialized to pass a law regulating the sale of caustic acid, caustic alkalies, and preparations thereof, and mineral or chemical salts intended for household use, including preparations ordinarily described as or called 'lye', and providing penalties for the violation thereof."

A committee, of which the writer was chairman, was appointed to bring this matter to the attention of the legislature, which was then in session. The chairman of this committee, accompanied by Dr. Ralph N. Greene, visited the capital and presented the crying need for this legislation. It was very evident that the humane side of

*Read before the American Bronchoscopic Society, St. Louis, May 28, 1924.

this matter was the one which interested the legislature most. The economic side also impressed them forcibly when the facts were presented to them showing the annual cost to the state for the hospitalization of children poisoned with lye. The legislators lent an attentive ear and arranged for the bill to be presented to the house of representatives on May 21. The various county medical societies were notified by wire of this date and advised to spread the necessary propaganda. The members of the county medical societies responded nobly and the result was that on May 21, telegrams poured into the capital from every corner of the state—from physicians, civic clubs, chambers of commerce, women's clubs and child welfare organizations.

What was the result? On May 21, house bill No. 218, which accompanies this article, was introduced by the Honorable Amos Lewis and in two days passed both branches of the legislature and became a law on January 1, 1924.

It is a pleasure at this time to again express appreciation and deep indebtedness to Governor Hardee and to both houses of the Florida legislature for their willingness to make of this emergency legislation.

The fact that this bill went through the house of representatives and the senate in two days is an evidence of the magnanimity of our legislators toward humanitarian objects.

The following is the text of the lye bill passed by the Florida legislature:

"An Act to Regulate the Sale of Caustic Acid, Caustic Alkalies, and Preparations Thereof, and Mineral of Chemical Salts Intended for Household Use, Including Preparations Ordinarily Described as or Called 'Lye', and Providing Penalties for the Violation Thereof.

"Be it Enacted by the Legislature of the State of Florida:

"Section 1. That on and after the first day of January, one thousand nine hundred and twenty-four, it shall be unlawful for any person or co-partnership or corporation to sell at wholesale or retail within this state any caustic acids or caustic alkalies or preparations 'containing such acids or alkalies' intended for household use, including preparations ordinarily described as or called 'lye', without affixing to the bottle, box, vessel, sack or package containing the same a label printed or plainly written containing the name of the article, the name and place of business of the manufacturer, seller or distributor of such household acids, alkalies or preparations thereof, and in addition the word 'Poison', which shall conspicuously

appear thereon in red capital letters not less than twenty-four point size or which shall be affixed thereto as a sticker conspicuously placed.

"Section 2. The word 'Caustic' shall within the intent and purpose of this act be construed to mean any 'acids or alkalies in liquid or powdered form of preparations thereof, or containing free or chemically unneutralized hydrochloric acid in a concentration of ten (10) per centum, or sulphuric acid in a concentration of ten (10) per centum, or nitric acid in a concentration of five (5) per centum, or carboic acid (phenol) in a concentration of five (5) per centum, or oxalic acid in a concentration of ten (10) per centum, or acetic acid in a concentration of twenty (20) per centum, or hyperchlorous acid (calax chlorinata bleaching powder or chloride of lime) in a concentration of one hundred (100) per centum, or potassium hydrate (caustic potash Vienna paste pearlash potassa carbonas) in a concentration of ten (10) per centum, or sodium hydrate caustic soda (concentrated lye) in a concentration of twenty tion of five (5) per centum.

"Section 3. Any person or co-partnership or corporation violating Section 1 of this act is guilty of a misdemeanor, and upon conviction shall be sentenced to pay a fine of not more than one hundred dollars and the costs of prosecution, or imprisonment of not more than 90 days.

"Section 4. This Act shall take effect upon its passage and approval by the governor.

"Approved by the governor and filed in office of secretary of state, June 7, 1923."

I am pleased to report that in Florida we have had the earnest and valuable co-operation of Mr. J. H. McLaurin, president of the American Wholesale Grocers' Association. The following letter is evidence of this and is now being used in Washington, where federal legislation is pending:

"Regard for the Public Welfare is the Highest Law"

AMERICAN WHOLESALE GROCERS' ASSOCIATION

Jacksonville, Fla., October 23, 1923.

TO THE WHOLESALE GROCERS OF FLORIDA; Gentlemen:

An Act to Regulate the Sale of "Lye".

I deem it of the greatest importance that your attention should be drawn at this time to the above bill passed at the last session of the Florida legislature, which law becomes operative on January 1, 1924.

You will note this law requires, in short, that every package of lye sold in the state of Florida shall carry thereon a POISON label, in 24-point type—in RED capital letters.

A copy of the bill is enclosed.

You will, I have no doubt, desire at this time to bring this bill to the attention of the manufacturers from whom you are purchasing lye, potash, etc., in order that the labels on the product you will sell after January 1, 1924 shall conform with the provisions of the law.

I can conceive of no more important legislation than that embodied in this Act and am confident that all of our people as well as the manufacturers of lye themselves will prove most responsive to this effort of the authorities to safeguard the life and physical welfare of men, women and little children. As both an economic and humanitarian movement, it is to be hoped that every state in the Union and the federal government as well, will fall in line with the states that have already enacted this POISON WARNING law.

Respectfully submitted,

AMERICAN WHOLESALE GROCERS' ASSOCIATION,

J. H. McLaurin, *President*.

Governor Hardee has also shown every interest which could be desired and has co-operated with us in a magnanimous way.

STATE OF FLORIDA—EXECUTIVE DEPARTMENT

Tallahassee

October 9, 1923.

DR. H. MARSHALL TAYLOR, Jacksonville, Fla.

Dear Dr. Taylor:

My attention has been called to an Act passed by the last legislature requiring that preparations containing caustic alkalies should be labeled as to the name of the article, name and place of business of the manufacturer, seller or distributor of such household acids, alkalies or preparations thereof and in addition, the word "Poison" conspicuously placed on the label in red letters. This Act becomes effective on and after the first day of January, 1924.

The necessity for this legislation is quite apparent. There are numerous cases of children who unknowingly take caustic acids resulting in death or at most physical impairment for life. We would be recreant to the higher duties imposed upon us if we did not use every effort possible in preventing cases of this kind. The Act above referred to was passed by the legislature in the hope that by proper labeling of caustic alkalies and all preparations contain-

ing the same should be very carefully guarded, thus preventing innocent children from becoming victims of its hurtful effects.

Under the law failure to comply with the provisions requiring proper label is punishable as a misdemeanor and I shall expect, of course, a literal compliance with the law when it becomes effective.

Thanking you for your interest in the subject and with personal regards, I am

Very truly yours,

Cary A. Hardee, *Governor.*

The point Dr. W. B. Chamberlin has developed, that in addition to the fine imposed that any individual injured or poisoned from the contents of improperly labeled containers of lye may now sue the distributor for personal damage, has been used to good advantage in our propaganda. Already I feel that this law has had its effect, for since January 1, I have yet to learn of a single case of lye poisoning occurring in Florida. During the same period of the preceding year six cases had fallen into the hands of the writer, alone.

In addition to the benefit gained through legislation, I believe much has been accomplished through the publicity given the dangers of caustic alkalies and the importance of keeping lye out of the reach of children.

I am confident that every member of this Society joins me in acknowledging with gratitude the wise counsel Dr. Jackson has given us in this effort toward child welfare. Only through his ceaseless and untiring effort has lye legislation been made practical and possible. Dr. Chamberlin has well said that "Dr. Jackson's attitude in this cause has been another evidence of the altruistic spirit which distinguishes and glorifies medicine."

202 Penn Bldg.

**MEDIASTITIS AS AN OCCASIONAL RESULTANT
COMPLICATION OF FOREIGN BODIES IN
THE ESOPHAGUS.***

DR. EDWIN MCGINNIS, Chicago.

The mediastinum is the central space in the chest which contains all the viscera except the lungs. The esophagus traverses the posterior portion of this space, above through the superior, and below through the posterior mediastinum. In connection with, and surrounding the esophagus, there are lymphatic vessels communicating with the pulmonary lymphatic vessels to terminate in the thoracic duct.

Thus one can readily conceive that foreign bodies caught in the esophagus could set up a localized infection that might pass through the esophageal wall to infect the lymphatics or the surrounding tissue of the mediastinum.

This is what happened in the following case. Fortunately for the youngster the intruder was a coin which did not puncture or cause a tear of the esophageal wall, and the bacteria were not very virulent.

W. J., age 3 years, white male child, was first seen Mar. 11, 1924. Mother stated that child swallowed a quarter about eighteen weeks previously. At first there was some difficulty in swallowing, but for the three preceding months, he had been able to take food with little difficulty. On a few occasions he had vomited. About the only outstanding feature of the situation was that he lost weight and had a croupy cough. Temperature when first seen was 98.8°, but mother stated that there were times when he had a temperature as high as 103°. The mother had some X-ray films with her that were so thick that nothing showed. X-ray films showed coin about one inch below sternoclavicular notch, and some shadows as of enlarged glands along the esophagus. During the operation with a short speculum the coin was seen and extracted with tube forceps. The edges were held in two grooves in the lateral walls of the esophagus. Breathing was somewhat labored for about one hour after the operation. The child slept well the following night. The next day occasional cough and dyspnea. A letter from the mother about one month later stated that the child was perfectly well,

*Read before the American Bronchoscopic Society, St. Louis, May 28, 1924.

and another letter dated May 18, 1924, that he had gained ten pounds. This case is reported to illustrate the fact that in certain instances a foreign object can remain in the esophagus a long time, and still be removed with comparative safety to the individual.

The next case illustrates what can happen in apparently simple cases. X-ray showed a coin just caught in the mouth of the esophagus. It seemed as if it could almost be wiped out with the finger.

The patient, F. J., white male child, age 18 months, on Apr. 1, 1924, had been playing with a nickel about 10 a. m., and had swallowed it. His parents stated that immediately afterwards he began to cough, strain and vomit, and was in considerable distress. Later the child was taken to a doctor in the neighborhood, who attempted to remove the coin. He worked for about two hours in this attempt, and finally gave up. The next morning, Apr. 2, I was consulted by telephone and I advised removal to the Presbyterian Hospital.

On admission to the hospital the child was breathing rapidly and with difficulty. The pulse was rapid and irregular, and the child appeared very toxic and in poor general condition. His temperature on entrance, 103.8°. X-ray picture showed coin in the esophagus at the level of the sixth cervical vertebra.

Operation: 2 p. m., without anesthesia. Direct view revealed right posterior faucial pillar swollen and covered with grayish exudate and bathed in pus. Coin was seen and grasped with tube forceps and removed without any difficulty.

Poor prognosis given.

The next day mouth and nasopharynx were full of foul pus. Notation by Dr. C. G. Grulee, "Child does not seem to have pneumonic process in the lungs."

Apr. 3, 9 p. m., child was examined by Dr. E. L. Boyd, House Pediatrician, and the following was noted, "Child very restless and thrashing about the bed. Hands and feet were cold. Breath offensive. Respirations very rapid and pulse imperceptible. Chest seems to have râles over both sides but sounds were obscured by gurgling and rattling in the throat. Sips of water swallowed did not reach the stomach, but were forcefully regurgitated. Considerable pus was brought up with the water."

Child died Apr. 4, 1924. We were unable to get an autopsy through lack of consent. Probable cause of death given as acute suppurative esophagitis and mediastinitis.

In this case, the trauma as a result of misdirected efforts in the attempt to extract the coin caused an injury of the periesophageal structures, and the infection produced the fatal issue.

Irregular or jaggedly sharp bones are very likely to penetrate the wall and, if they remain any length of time, set up an infection. I had two such cases at the same time. In one there was a marked purulent esophagitis, yet after removal of the foreign body the patient made a good recovery. In this case the left recurrent laryngeal nerve was, however, involved in the inflammation, because it took the left side of the larynx about ten weeks to recover its action.

In the other case, Miss J. J., age 38 years, May 11, 1923, while eating fish at dinner had a small bone caught in the left side of the throat. She had considerable pain and difficulty in swallowing, but this gradually diminished. The following day she consulted Dr. Keating, who made some X-ray pictures. There was no definite evidence of bone or other material in the esophagus shown in the pictures. I first saw her at my office, May 16, 1923, five days after the accident. There was tenderness of the left side of the neck behind larynx, and this extended down toward the clavicle. Because of this tenderness, we decided to investigate the food passages. She had a fear of pain and wished a general anesthetic. With all this in mind, she entered the Presbyterian Hospital, May 18, 1923, for examination.

The usual pre-operative preparation was carried out. Dr. Mary Lyons gave an ether anesthetic. Examination of the upper end revealed a bluish area of the left side of the esophagus about one inch in diameter with a small softened portion in the center covered with a gray exudate. No foreign body was found, but I reasoned that this was the location of the penetration of the fish bone. Patient was in good condition for about six hours after the operation. During the night, the left side of the neck and face became swollen and the left eye almost closed. Crepitation was present from angle of jaw to clavicle extending across the mid-line. Lungs were apparently normal at that time. House Surgeon, Dr. W. Gallagher, examined her and found some tenderness over the middle of the left sterno-mastoid muscle. Crepitation and swelling of the left side of neck was present. Breath sounds were slightly roughed over the left apex. Breathing was still labored. Next day she was slightly cyanotic and breathing was still labored. About twenty-four hours after operation, she began to cough

and raised a large amount of thick yellow material with foul odor. Swallowing was difficult.

The next day swelling of the face and neck was very greatly reduced, and she could swallow and talk without much difficulty. Her condition did not improve and five days later I decided to open the neck. This was done with local anesthesia, and by the method advised by L. W. Dean. No pus was encountered, but a foul smelling gas was evacuated. The drainage gave great relief. Dr. Sullivan put down a Rehfuß tube so that she could be fed without swallowing. The next few days there was profuse discharge. It was all to no avail, because she died early on May 28, ten days after our esophageal examination.

Examination of blood on entrance showed hemoglobin 90%, leukocytes 12300. Systolic pressure 134. Diastolic 78. Urine, trace of albumin. No casts, but a few epithelial cells and a few leukocytes. May 27, 1923, urine, albumin 1 m.m. ring. Hyalin casts were present. Blood showed a leukocyte count of 28000.

"X-ray of the chest taken May 26, 1923, showed rather marked emphysema around the soft tissues of the neck. Negative for bone change. The left costo-phrenic angle was clouded. Heart was considerably enlarged to the left with fairly broad supra-cardiac shadow. Left lung field was clear. There was a catheter extending the entire length of the esophagus. Findings were compatible with subcutaneous emphysema about the neck, enlarged heart shadow, and probably fluid in the left pleural cavity." Dr. C. B. Rose.

Necropsy performed May 28, 1923.

Report of the Pathologist, Dr. H. A. Oberhelman—Clinical Diagnosis—Perforation of the esophagus (fishbone) suppurative mediastinitis, and pericarditis. Anatomic Diagnosis—Localized hyperemia and hemorrhage of the esophagus (fishbone injury) left side; extensive suppurative peri-esophagitis, peritracheitis and mediastinitis; suppuration perforation of the trachea; sanguino-purulent tracheitis and bronchitis; sero-fibrinous pleuritis; early aspiration broncho-pneumonia; marked edema of the lungs; compression atelectasis of the lower lobe of the left lung; localized mural thrombosis innominate vein; marked hyperplasia of the mediastinal lymph glands; localized ulcer of the left aryepiglottic fold; recent surgical incision of the neck rubber drain; subcutaneous emphysema of the neck and shoulder; cloudy swelling of the liver and kidney fatty

changes of the liver; localized fibrous peri-hepatitis; pressure furrow of the liver (corset liver); partial calcareous fusion of the right and left aortic cusps; retention cyst of the left kidney; fetal lobation of the kidneys; vaccination scar of the left upper arm; some long since absent teeth."

Observing the post-mortem material I was struck with the fact that our examination was only an incident in the progress of this case. The ether anesthetic and the slight trauma of the examination no doubt hastened the march of the infection. If I should ever come across a similar case I would advise and do an early external drainage.

104 South Michigan Ave.

BRONCHOSCOPIC FAILURES WHICH ARE SUCCESSSES.*

DR. J. W. JERVEY, Greenville, S. C.

There are some apparent successes that are notable failures, and "vice is vorser", as Mr. Weller might have said, or as Mr. Ring Lardner or Mr. Sam Hellman would say, if they happened to think of it—though as far as I know none of them has yet said it. We are all familiar with the cynical old saying: "The operation was a success, but the patient died." In the world of bronchoscopy—and no doubt you have all experienced the fact—it not infrequently happens that the operation is a failure but the patient recovers—a happier eventuation even if a less brilliant performance. Let me illustrate my meaning.

Here is a little girl of seven, who two hours ago inspired a cockleburrr. Strident breathing and anxious facies. Vomited several times coming miles in an automobile. A cockleburrr usually lodges in the larynx, in my experience, and I expected an easy case. But it was not in the larynx. Nor was it in the trachea, nor in the left bronchus. I could not be positive it was in the right bronchus, and after two or three attempts at definite location, rather than provoke trouble by further manipulation at unskilled hands I suggested taking the child to another and more facile bronchoscopist. This advice was tentatively accepted. On the way home she coughed up the cockleburrr—so they said! And I do not doubt it—but, I

*Read before the American Bronchoscopic Society, St. Louis, May 28, 1924.

failed in my work. Nevertheless the patient recovered, and the humble operator was the recipient not even of gratitude. But I comforted myself with Lowell's thought: "Not failure, but low aim is crime."

Next passes in review a tiny infant of one year. Eighteen hours before he had swallowed the inevitably open safety pin, and it had "stuck in his throat" with the usual symptoms of esophageal foreign body. It was there all right, hinge down of course, about the cricoid level, and the point stuck in the lateral wall right up to the heel. It was a simple matter to release the point, but the moment it was free the pin slipped swiftly down to the cardiac isthmus. Several futile attempts were made to get the Tucker forceps in action, and the operator's "surplus and undivided profits" of patience being exhausted the parents were advised to take the child to a master hand. About twenty-four hours later Dr. Jackson saw the little victim, and the open pin was reposing in the stomach! Eighteen hours later, harmless and unharmed, without apparent let or hindrance, a perfect specimen of the "unsafety" pin, it appeared *per vias naturales* amid the loud acclaim of the assembled parents! I am glad to be able to report to the Society that in this case the operator received for his pains a beautiful letter of thanks and gratitude, which beyond a doubt was largely inspired by Dr. Jackson, who, in conversation with the family, in his inimitable and boundless generosity, advised them that I had saved the little patient's life! Yet my bronchoscopic effort was nothing more or less than a miserable, grinning and chagrin-ing failure—but, the patient recovered! Yet as Propertius says in his *Elegiae*: "The effort will deserve praise. In great enterprises the attempt is enough."

Now let us consider the cases of the old lady with a hunk of meat, and the old man with a chicken bone in the esophagus—they are of one and the same variety. The bronchoscopist, after a day of toil and travail is peacefully, perhaps thankfully, partaking of his evening meal in the bosom of his family. The aforesaid old lady (or old man, as the case may be) is doing the same. Suddenly the doctor's 'phone rings. The old lady is "choking to death" on a piece of meat. Of course she had no business having such a hunk in her mouth, nor had the old man any business having a bone of any kind in his, but that, like "the flowers that bloom in the spring, tra la", has nothing to do with the case. They were there, in bad, and got in worse, and they had to be gotten out. In each case the foreign body

is easily located; the tube is temporarily removed, and before it can be re-inserted the intruder, with a great heave, retch and cough is ejected. A case of spontaneous or auto-cure. The operation failed, but the patient recovered. No gratitude, no thanks, "no nothing"; rather resentment on the part of the patient that he was put to the trouble of coughing the thing up when the doctor should have done the trick for him! In such a case one cannot help thinking of Rabelais in his "Gargantua": "Il battoit les buissons sans prendre les ozillons"—He beat the bushes without taking the birds!

Some few years ago a small boy of eight years sucked a carpet tack into his right lung. There it stayed for several months before assistance was sought. There it was, just as the X-ray showed it, in the *right* main stem bronchus, near the second branch. The point was up and visible, but the rest of the tack was hidden by thick granulations. The point was easily seized with forceps, but the tack was so firmly embedded that such moderate force as was thought advisable failed to dislodge it. The case was referred to the magic hand of Jackson. He wrote me a nice letter saying he had examined the child and casually mentioned the presence of the foreign body in the *left* main bronchus, saying he would remove it the following day. Two days later he wrote that he passed the bronchoscope on the appointed day into the left bronchus but could not find the tack. Nor was it in the right bronchus. Another X-ray showed it in the intestinal tract, whence it emerged harmlessly in due course. The case reminds one of the serious-minded canine pursuing the elusive flea. The operation was a stale, flat and unprofitable (at least for me) failure—but, the patient recovered. And in this connection one cannot help but think of DeQuincy quoting the Emperor Galerius speaking to a soldier who missed the target many times in succession: "Allow me to offer my congratulations on the truly admirable skill you have shown in keeping clear of the mark. Not to have hit once in so many trials argues the most splendid talents for missing."

All of these things are common occurrences. Without a doubt you have all had similar experiences. They point a moral, though there be no tale to adorn. It is this: that patience is an attribute of importance second only to skillfulness in the successful practice of bronchoscopy. Some of the cases referred to and others that I could cite but for fear of boring so polite an audience, could and would have been successfully

and prettily disposed of by the expenditure of even a reasonable modicum of that overwhelming virtue, and particularly by the observance of the ancient adjuration, "if at first you don't succeed, suck, suck 'til you do succeed." Furthermore, it is truly remarkable how a bronchoscopic procedure, that at first blush seems most unpromising, often becomes amazingly simplified after a wait of a few days for another try at the problem.

That is perhaps a trite observation, but, as the old Dutchman said, when asked why he always said the same thing: "becoss, py gott, it always *iss* de same ting." As Service says:

"And each forgets, as he strips and runs
With a brilliant, fitful pace,
It's the steady, quiet, plodding ones
Who win in the lifelong race."

And after all, if we have fought a good fight and have kept the faith, we may remember the words attributed to Archbishop Trench by Professor Connington:

"Not all who seem to fail have failed indeed.
Not all who fail have therefore worked in vain.
There is no failure for the good and brave."

COMMUNICATION.

In the September issue of *THE LARYNGOSCOPE* appeared an article on "Functional Tests of Hearing", by Isaac H. Jones and Vern O. Knudsen, in which Dr. Jones enumerates the different authors who have done work in this line during the past five years, and the instruments which were used by them for the functional test of hearing. In this article he failed to mention the instrument demonstrated by the undersigned in the New York Academy of Medicine on May 13, 1921, and described in *THE LARYNGOSCOPE* in December, 1921, under the heading: "A New Method of Measuring Hearing Power by Means of an Electric Acumeter". Another article also by the undersigned appeared in *THE LARYNGOSCOPE* in November, 1922, under the title: "Further Studies in the Functional Examinations of the Acuity of Hearing and Its Relation to the Perception of Sounds of Different Pitches Produced by the New Electric Acumeter".

I am sure this omission was in the nature of an oversight on the part of the authors and I am calling attention to it so that it may be a matter of record in the literature concerning this particular subject.

JOHN GUTTMAN.

CHRONIC PSEUDO-MEMBRANOUS LARYNGITIS.*

Dr. Richmond McKinney, Memphis.

Mrs. M., age 40 years, consulted me Mar. 15, 1922, with the history that since the previous November she had been annoyed by a "lump" in the throat, which she located just about the cricoid region. This symptom developed suddenly.

She claimed to have been treated for "ulcer of the stomach", among other things. The "lump" at times seemed to move upward, afterward returning to its original location. There was no difficulty in deglutition, and on fluroscopy, barium milk passed without other than the normal delay at the cricoid and cardiac regions.

Being a woman of very nervous temperament, the diagnosis recorded on her history chart was globus hystericus, but since her symptoms continued, I advised a direct examination, this being more for suggestive therapy than with the expectation of discovering anything abnormal.

Without anesthesia, save the customary application of 10 per cent cocain solution to the hypopharynx, the esophagoscope was passed to the cardia, but no unusual resistance was encountered, and the wall appeared normal. A 7 m.m. bronchoscope was then introduced, and the trachea explored; nothing abnormal was revealed.

She was occasionally seen by me from this period until the latter part of May, 1923, with no amelioration of her symptoms, but toward the end of May she 'phoned me that she had coughed up a mass of, as she described it, "gristly" substance, and that she was entirely relieved of the symptom of "lump in the throat".

The specimen was brought to me the next day, and on inspection seemed to be a tracheal cast. It was submitted to the pathologist of the University of Tennessee for examination, and his description of the specimen was to the effect that it measured 3x3.5 c.m., consisting of a delicate spongy gray material, the meshes of which were filled with a clear translucent mucus-like substance. Section showed a diffuse network of fibrin, in its meshes being large numbers of desquamated, degenerated epithelial cells, likely squamous in type, large and

*Read before the American Bronchoscopic Society, St. Louis, May 28, 1924.

small mononuclear cells, plasma cells, polymorphonuclear cells and serum. It was regarded as chronic pseudo-membranous laryngitis.

The pseudo-membrane evidently was subglottic, just beneath the cords, and was overlooked by me when I passed the bronchoscope.

SPASMODIC STRICTURE OF THE ESOPHAGUS IN A THIRTEEN-MONTHS OLD BABY.*

DR. RICHMOND MCKINNEY, Memphis, Tenn.

Dorothy S., age 13 months, living just outside of Memphis, was brought to me on Jan. 29, 1923, with the history that on Dec. 12, just past, while playing fell and on getting up, began crying and vomiting. Ever since then she had had difficulty in swallowing, food being regurgitated, and apparently she seemed to suffer pain on attempting deglutition. The baby had been losing weight steadily. She even seemed to have some difficulty in swallowing saliva, for this ran from her mouth freely.

Esophagoscopy, without anesthesia, was done the next morning. A Bruenings 7 m.m. bronchoscope was introduced, and the esophagus carefully inspected. No abnormal resistance whatsoever was encountered, and the esophagus from cricoid to cardia was normal in appearance. A Jackson No. 12 linen bougie was passed to the stomach. Fluoroscopy was not attempted.

Complete relief followed this procedure, with no further difficulty in deglutition, the baby gaining weight rapidly, until about a month later, when difficulty in swallowing again was developed. The same routine was used, and there has been no return of the symptoms since.

This doubtless was a spasm, but I have never seen a case similar to this in a very young child, and can find no report of this occurring in one so young. Furthermore, what caused the spasmodic reflex, the fall sustained?

Bank of Commerce Bldg.

*Read before the American Bronchoscopic Society, St. Louis, May 28, 1924.

AMERICAN BRONCHOSCOPIC SOCIETY.

Wednesday, May 28, 1924.

Bronchoscopic Failures Which Are Successes. Dr. J. W. Jervey, Greenville, S. C.

DISCUSSION.

DR. T. E. CAEMODY (Denver): I think Dr. Jervey is to be congratulated on confessing these failures; most of us have not the courage to do so. We like to tell of some of our failures, but we like to do it in private. All of us have failures; if we don't we haven't had many bronchoscopic cases. I recently lost a foreign body from the esophagus into the stomach—it finally passed through very nicely. This is not an uncommon occurrence with me.

One point which Dr. Jackson emphasizes is the time we work on these patients. Dr. Jervey said he stopped working over a case after thirty minutes. That is wise. If we work too long we lose our patients. Dr. Jervey is to be complimented upon knowing when to stop.

DR. SEYDELL: I would like to report a unique foreign body case: Last November a child two years old while playing on the bedroom floor started to cry. The mother had no difficulty in quieting the child but noticed at the next feeding that the child could not swallow solid food. Nothing was done until three days later, when she refused all food and was taken with a vomiting spell. At this time she was taken to their family physician, who suggested an X-ray. This revealed a rosary, the crucifix being lodged in the upper part of the esophagus and the chain and beads extending into the stomach. Under general anesthesia the crucifix was grasped and an attempt was made to remove it. On account of the firmness of the chain it was impossible to do this. I then inserted the esophagoscope deeper and near the cardia found a piece of meat packed in the chain. After removing the meat, it was an easy matter to remove the rosary and crucifix.

DR. GEORGE F. KEIPER (LaFayette, Indiana): Dr. Jervey's paper is quite refreshing, for he deals with the common experiences of us all. Many of us are like Dr. Jervey in that we practice in small cities and we lack, as a consequence, the experiences of those in the larger cities. Dr. Chevalier Jackson has told us to take our time wherever possible and diligently work out the problem confronting us after its revelation by the clinical symptoms and the clinical signs present; by no means neglecting to have a sufficient number of X-ray plates made for localization purposes. These patients do not demand haste. I am sure you all are like me in this respect, that some of the most grievous mistakes which we have made are those wherein we were in too much haste to afford relief to our patients. It must be the dictum to do no harm. If a problem arises which we seemingly are unable to solve we should turn over the case to someone with more experience. The most successful person is not the one who makes no mistakes, but rather the one who makes the fewest mistakes.

Asymmetry of the Pyriform Sinus and the Mouth of the Esophagus. Dr. Harris P. Mosher, Boston, Mass.

DISCUSSION.

DR. L. W. DEAN (Iowa City): I want to express my appreciation of this paper by Dr. Mosher. Hearing it has paid me for coming to St. Louis. This paper will help me solve certain problems which I am studying.

Deaths following esophagoscopy are much more common than those following bronchoscopy. The unfortunate result is frequently due to traumatism of the lower pharynx any the beginning of the esophagus. Emphysema, swelling of the neck with inflammation of the lower pharynx and upper end of the esophagus resulting in painful deglutition but fortunately not mediastinitis, is sometimes seen. I am inclined to think that traumatism which is usually at the upper end of the esoph-

agus is the result of conditions which Dr. Mosher has just described. It is due to the buffer action of the cricoid, and the asymmetry of the lower pharynx and upper esophagus.

I have found that when there is any difficulty in inserting the esophagoscope into the upper end of the esophagus that the following procedure can be carried out without any traumatism: Taking a large laryngeal spatula, the glottis is first located; then the spatula is slipped behind the arytenoids, and, by means of it, the cricoid cartilage is lifted forward so that the opening of the esophagus is plainly seen, and the esophagoscope may be placed in exactly the right position to enter the esophagus without trauma.

Sometimes when the patient swallows, one can see into the esophagus for a distance of from two to three inches below the cricoid. I recommend that this procedure be carried out whenever there is difficulty in entering the esophagus. The asymmetrical conditions of the lower pharynx, as described by Dr. Mosher, will be noted before the esophagoscope is passed.

DR. JOSEPH BECK (Chicago): There is no use in throwing any more bouquets at Dr. Mosher. I think we should use our clinical experience in accounting for the etiological factors in the formation of these pouches. I have seen many cases of small, as well as of large pouches. In connection with the anatomical explanation of these, there is one fact which is often forgotten in the etiology, and that is the extension of infection by continuity of structure. Why should we have very severe tonsillar pharyngitis and have it stop there? With the asymmetry of the region, and weakness of that space, there might easily be such an effect following an acute inflammation of a violent character, although pharyngitis is not always the explanation. The esophagus is a sensitive organ, although the heat and cold of food are easily borne. I believe, therefore, that, realizing this sensitive point, after the recovery of a patient from a severe tonsillitis or pharyngitis we should advise him to be more careful in feeding as regards solid food and avoid the bolting down of the bolus of food.

DR. WAUGH (Cleveland, Ohio): I have seen cases in which there has been marked disagreement as to whether the patient had a diverticulum or not. This may be caused by the fact that barium mixtures of different densities were used in different examinations. The Roentgenologists could clear up these cases by using a uniform type of barium solution. In cases in which there is a very small slit-like opening, a fluid of one density will pass through and will fill up the pouch, making it visible, whereas fluids of a heavier density will not pass, and in consequence the pouch will not be shown.

A Case of Bilateral Peanut Kernel in the Bronchi. Lantern-Slides of Some Recent Bronchoscopic Cases. Dr. H. B. Orton, Newark, N. J.

DISCUSSION.

DR. HAYES: I had a bilateral peanut case last winter in which I failed, perhaps because I did not have a No. 3 bronchoscope. The obstruction was at the entrance of the lower right bronchus. The child was twenty months old. The foreign body was found at autopsy.

DR. LAYMAN (Indianapolis): I should like to ask Dr. Orton to explain the technic of removal used in the case shown where a needle was trans-fixed across the esophagus. How did he get it out?

DR. H. B. ORTON (closing): The man had a large swelling in the external part of the neck. I was able to bring the foreign body back by using the forceps and the esophagoscope as counter pressure.

Foreign Body Perforating the Esophagus, With a New X-ray Sign of Perforation. Case Report. Dr. Samuel Iglaue, Cincinnati, Ohio.
Mediastinitis, the Sequel to Foreign Bodies in the Esophagus. Dr. Edwin McGinnis, Chicago, Ill. (Candidate's Thesis.)

DISCUSSION.

DR. R. P. SCHOLZ: I wish to report briefly two cases which occurred in my own practice and which may add to the information presented

in these two excellent papers. Both cases were of foreign bodies perforating the esophagus and both ended fatally. In the first case there was evidence of a healed mediastinitis, and in the second there was a mediastinal abscess. The latter patient died following an external operation for the removal of the foreign body. The first patient was a woman 27 years of age; an epileptic, who during a seizure swallowed her upper denture, which lodged in the esophagus, nineteen months before the patient presented herself to me. She had been under the care of two excellent men, who had been misled by a radiogram. The Roentgenologist who first examined the patient, reported that there was no foreign body present. The shadow of the denture was obscured by the shadow of the vertebral column. Shortly thereafter the patient consulted another laryngologist. He, probably wishing to spare the patient the expense of another X-ray, referred to the first radiogram. The Roentgenologist reported to him that the plate failed to show a foreign body. The patient was again told to go home and forget it, and was assured that she was only nervous and had not swallowed her false teeth. When I saw her, I had another X-ray made, and in this the denture was discovered. Thereafter, I made two attempts to remove the foreign body, but found the metal plate so firmly imbedded that I was unable to extract it. Subsequently Dr. Robert Schlueter did an external operation, entering the mediastinum posteriorly. He found the mediastinum filled with very dense connective tissue, this tissue so binding down the plate that he even had difficulty in extracting it. The plate was lodged at the level of the aorta, the teeth projecting backwards. The teeth, together with the posterior alveolar horns, had eroded through the esophagus into the mediastinum, which made, I believe, the plate impossible to remove by endoscopy. The patient died two days after this external operation.

The second case was that of a child, 12 years of age, who had swallowed a lead dress weight about the size of a half dollar. At the time of my esophagoscopy, I had a large audience of physicians and nurses. I had no difficulty in locating the foreign body and took pleasure in demonstrating it to each of my guests. But when I proceeded to remove it, I was no longer able to find it. There was pus, however, in the tube and in the esophagus. Not being able to find the foreign body, I concluded that it had gone on down the esophagus. As a surprise to us, the patient suddenly died during the night. At the post-mortem, the weight was found in a large mediastinal abscess.

It occurs to me that each of these cases teaches a very valuable point. The first, that economy is not always the best policy; rather another plate, than to depend upon an unsatisfactory examination. In the second case, that we should remove the foreign body when found; rather be less courteous to our guests, than to jeopardize the safety of the patient.

DR. PEARSON (Des Moines, Iowa): I wish to mention two cases within my observation. In one an old gentleman was swallowing a large bolus of food, at the dinner table, when he choked for a moment and had a severe spell of coughing, following which he was unable to take food because of the resulting pain. He was brought to me two or three days later, and finding nothing in the esophagus, an X-ray picture was taken, which demonstrated a fracture of the hyoid bone. Proper strapping resulted in a cure within a short time.

The second case was that of a young girl about 10 years of age, who had remained home from school for a couple of days because of indisposition. The physician who was called at the time, because of her inability to swallow, suspected a foreign body in the esophagus. Examination, however, revealed the esophagus free, but a paralysis of the diaphragm was present. The cause of the trouble evidently was an acute infection located in the brain stem and involving the respiratory center.

I have also seen two deaths which resulted from foreign bodies in the esophagus, infection developing from the point of injury.

DR. GRAHAM (San Francisco): I have a series of disasters to report. A nurse came to me with pain in the esophagus of about nine days' duration. She complained of a great deal of pain in the neck and was beginning to spit up pus. From the history and X-ray I determined that a foreign body was lying outside of the esophagus. It looked easy to get. I did an esophagoscopy under local anesthesia and found nothing except pus. The manipulation from the esophagoscope evidently dislodged the foreign body, but she complained of having lost a piece of porcelain inlay from a tooth. We took her to the X-ray room and found that the porcelain inlay was in the cavity where the bone had been. Under the fluoroscope I attempted another extraction for the porcelain fragment. In the darkness of the room my forceps were broken, for when I put them into the esophagus the end of the forceps came off. I then took another forceps and extracted foreign body No. 3. We did not find the porcelain. We did an external operation and failed to find the foreign body. The X-ray, however, showed it had disappeared. The patient recovered, but during the week that I was treating her, her mother swallowed a prune pit which lodged in the larynx and was left in seven days. She coughed it up. This made four foreign bodies in one week in one family, which is enough.

DR. LEWIS (Los Angeles): I had a case some years ago which presented a very confusing problem and which I considered a case of mediastinitis. I do not know now what it was. The patient, a heavy, bull-necked Irishman, had been in bed for a week with acute febrile symptoms and dysphagia. At the time I had an old fashioned Freiburg outfit, with which I attempted to go in under local anesthesia. I found there was a queer colored exudate, which looked like corn starch blanc mange, in great quantity in the esophagus. I then used ether in order to introduce the tube and found this exudate extending as far as I could go. I could not find a foreign body. On removing the tube I found a bolus, half an inch in diameter, which was impregnated with this blanc mange-like material. On further examination of this bolus it was found to consist of short threads of various kinds. The man had been in the habit for many years of putting threads in his mouth and biting them off. These threads had accumulated for many years and had formed a solid ball, which had lodged in the pyriform sinus. There were no local symptoms indicating the presence of a foreign body until streptococci infection occurred. The patient made a good recovery and is now well.

DR. S. IGLAUER (closing): I was pleased to hear Dr. McGinnis say that he advised early operation. I think the whole question to decide is "When is an external operation indicated?" I did not feel competent to lay down rules for operation, so I quoted Killian. He has two groups: 1, positive; 2, relative. I think the formula which he has set down will tell us when to operate, inasmuch as he has reviewed 380 cases of surgery of the esophagus. We are "internists" in the sense that we work inside, but as esophagoscopists, I think we should sometimes resort to some other method. Dr. Scholtz' cases illustrate that very well. One died with operation, one died without it. The mortality from operations in infected cases is about 50 per cent. Dr. Mosher spoke of one symptom of perforation; that is pain over the lower sternum. Pain alone would not be sufficient indication for operation. There is a triad; pain, fever, swelling, especially if increasing. Killian has constructed a chart of pain, fever and swelling on the horizontal lines. By this means we can chart the cases which go on to recovery or to operation. Dr. Graham's story reminds me of an irascible old veteran of the Civil War whose daughter was in the hospital, being confined. At midnight the telephone rang and the nurse announced the arrival of a fine boy. Shortly after the phone rang again and another fine boy was announced. That is all right, growled the old man, but don't telephone me again.

Lilenthal, in his last article does not think that the posterior route is difficult, if care is taken not to tear the pleura. As I understand the operation, he exposes the 9th rib and takes out the greater portion sub-

periosteally. He then sticks his finger in under the 8th rib and separates the pleura and divides the 8th rib at the angle of the rib. He then divides the 7th, and so on. Then by putting in a retractor he can lift up the whole series of ribs like shingles on a roof. The cartilages are sufficiently elastic to allow of the lifting of the ribs from behind. He says he can treat infectious process this way. I see no particular reason why a thoracic surgeon should not perform an operation for perforation of the esophagus. The lower esophagus can be reached by way of a laparotomy; but I do not think this route advisable in most cases. One can also reach the upper esophagus through the neck by way of the thoracic aperture; but there is a no man's land in the posterior mediastinum which few wish to enter. At times it is necessary to go in and help the patient when there is infection in that region.

DR. MCGINNIS (closing): There is one point that Dr. Iglauer called attention to, and that is the air bubble in the tissues. We discussed that point with the Roentgenologist. We did not think it was a perforation, but thought we had an infection there by a gas producing organism. We had another case where a patient on the general surgical service developed thickness of the neck and the lower portion of the face. There was crepitation and the tissues were full of air. The surgeons wondered what had happened. The explanation was that, following an ileostomy, flatus had invaded the tissues up to the neck. In my last case there was a perforation of the trachea on its posterior aspect just above the bifurcation. Every time the patient coughed the face and neck filled with air, giving the appearance of great swelling.

An Experience in Medical Legislation. Dr. H. Marshall Taylor, Jacksonville, Florida.

DISCUSSION.

DR. T. E. CARMODY: One point has not been brought out; Dr. Jackson sent slides to all of us on the committee of the A. M. A. and we can show these slides before medical societies and at lay meetings. I have arranged to have this bill introduced in the Colorado legislature next year. Dr. Taylor has helped me very much by sending me his literature, of which I shall make use.

DR. GEORGE F. KEIPER (LaFayette, Indiana): I wonder if you are aware that at the present moment bills are before the two Houses of Congress, looking towards national legislation on this important subject, which if accomplished will compel manufacturers to put a poison label upon all such packages. At the solicitation of Dr. Jackson I have taken up this work for Indiana, because the chairman of the reference committee of the House of Representatives having this bill in charge is from the Fifth District of Indiana, the Honorable Everett Sanders of Terre Haute. So through the congressman from our own district we have been laboring to get an early report favorable to the passage of the bill. Our senators have also been solicited for help and they have been quite responsive. But Congress is about to adjourn to attend the national conventions and then to return home. We must have quick action if possible and it is your duty this very day to communicate with your representatives in Congress urging quick action. Remember, in all such work the personal solicitation is what counts most, outside of the personal contact. Next January we shall introduce similar bills into the General Assembly of the state of Indiana, for we must get state action as well as national action. The national law will not cover the manufacture of these preparations within the state, if such preparations are not sent outside of the state into interstate commerce.

DR. PEARSON (Des Moines, Iowa): I am Chairman of the Legislative Committee of the Iowa State Medical Society. I passed Dr. Jackson's letter on to our committee, and at my second inquiry I found that it had been passed without any trouble.

DR. ORTON: I would like to mention the status in New Jersey. The Lye Bill has been passed and becomes a law on the Fourth of July. This is due to Dr. Jackson's literature and to the slides which he so kindly loaned me. We have used the literature and broadcasted it throughout the state. We did meet with opposition at the last moment from a large

wholesale drug firm, Lehn and Fink, but this was overcome, and the bill was passed unanimously without any objection whatsoever. Three days later it was signed by the governor.

DR. J. W. JERVEY: There is very little difficulty in convincing legislators that this is humanitarian work of the utmost importance, when we can present the literature and slides of Dr. Jackson. The appeal for children is strong and the bill meets with no opposition. We got it made a committee bill in the Legislature of South Carolina without any opposition whatsoever. I think this matter should be taken up by the Committee on Medical Affairs of various legislative bodies and there will be no difficulty in getting the bill passed.

Foreign Bodies in Air-Passages and Esophagus; Review of Cases in History and Literature. Dr. Ellen Patterson, Newark, N. J.

DISCUSSION.

DR. W. V. MULLIN (Colorado Springs, Colo.): The reference in Dr. Patterson's paper to the sensation of the foreign body moving up and down in the air passages, reminds me of an experience which a physician friend of mine recently related to me. This doctor does considerable bronchoscopic work himself. He was eating corn on the cob at lunch and had a slight choking spell and felt that he had aspirated a kernel of corn. He went back to his office and lay down on his couch in the reverse position with his feet elevated and his head down. He said the movement of the foreign body was quite perceptible to him and that he felt it move up and down. Gradually he worked it towards the larynx and when he felt it there, gave a forceful cough and the corn was expelled over the end of the couch. He said that when he was relieved of this he experienced the most gratifying sensation that he ever felt in his life.

Observations on the Technique of Bronchoscopy for Disease of the Lung. Lantern and Motion-Picture Demonstration. Dr. Robert M. Lukens and Dr. William F. Moore, Philadelphia, Pa. (Candidate's Thesis.)

DISCUSSION.

DR. T. E. CARMODY (Denver): An interesting presentation of this kind should not pass without discussion. We must remember the pioneers in this field and what we owe to them. Dr. Jackson is clinically improving on this work all the time; but Dr. Yankauer did some work years ago in washing of the lung. Dr. Lynah also did work in washing out the lungs and then injecting them with a preparation of bismuth; this put the work on its feet. At the time of Lynah's first article I was especially interested in cases treated by this method and reported six. I have not seen many since, but we have a few cases coming all the time who need this treatment. We have not the possibilities of carrying out this work as in Dr. Jackson's clinic. Dr. Moore mentioned the armamentarium of the operator. We should suppose that everyone would have all the needed instruments ready before attempting bronchoscopy. We should recall Mullin's work on the sinus and on bronchiectasis. In one case of mine the bronchiectasis was diagnosed pulmonary tuberculosis, but no tubercle bacilli were found.

DR. L. W. DEAN (Iowa City): In our service we have had much difficulty in securing permanent good results in chronic lung suppuration, except in cases of syphilis or in cases where a foreign body was present. Not long ago I visited Philadelphia and spent the day not with the bronchoscopists but with the internists who were interested in chronic lung suppuration. Dr. Elmer H. Funk showed me the clinical charts of many patients and also brought me in contact with patients who had been treated for lung suppuration. From the charts and from the patients themselves I secured the story of incapacitation extending over years and then bronchoscopic treatment, with a great increase in weight and well being and an improvement in outlook. All patients did not respond to treatment; some were made apparently well. I talked with one patient who had a post-tonsillectomy lung abscess and who had not needed treatment for one and one-half years.

DR. GRAHAM (San Francisco): I hardly think that the relief of the spasm of asthma can be compared with the relief of the symptoms in bronchiectatic cases. There are cases of asthma which are relieved by the passing of the bronchoscope, but they are not frequent. In one woman 30 years of age, who had had asthma all her life, I passed the bronchoscope and for one and one-half years she had no attack. Later she thought she was going to have an attack and came back to have the procedure repeated. I passed the bronchoscope and she has had no other attack for six years. This probably has something to do with a dilatation of the glottis, more than with any effect in the lung. It is the interference with some nerve supply that is causing the spasm in the bronchioles. I doubt somewhat the relief being due to the introduction of cocaine and adrenalin in the bronchi.

DR. GEORGE F. KEIFER (LaFayette, Indiana): I desire to call your attention to the treatment of asthma by direct endoscopy. Early in this work I became acquainted with the work done abroad by our confreres and especially with the work of our own confrere, the lamented Henry Horn. I, too, have tried to treat severe cases of asthma by the introduction of tubes into the bronchi. I shall never forget my first case. He was an alcoholic and the paroxysms he suffered seemed alarming. I put a tube into his right bronchus and when it was in position the bronchus ahead began to contract and dilate in an alarming fashion. Hurriedly the long canula was introduced and through it a solution of epinephrin and cocaine was introduced. The amount of secretion expelled from the man's lungs was simply enormous and with complete relief. From this it seems that we must change our ideas concerning the pathology and etiology of asthma, in that perhaps the whole trouble is entirely local and is due to the irritant action of the retained secretion. This must in due time become literally rotten, thus causing contraction of the bronchioles and locking up further secretion. This patient was relieved for six months. Of course the treatment had to be repeated from time to time. This method of treatment is well worth trying in those cases where we are unable to obtain relief by the ordinary remedies.

DR. WAUGH: Did he have no symptoms at all for six months, or was he merely without violent attacks?

DR. KEIFER: He was completely relieved of all symptoms for six months.

DR. W. V. MULLIN (Colorado Springs): I am very sorry that the surgeon and internist who are down to open the discussion on this valuable paper are not present. I should like to hear their side of the question. I have heard that, at the meeting of the National Tuberculosis Association recently held at Atlanta, Georgia, there was some adverse criticism of the bronchoscopic treatment of lung suppuration. The charge was made that it did not produce results and might start up a broncho-pneumonia. I told the doctor who told me of this criticism that he might say that Kreissler could not play the violin, but no one who had ever heard him play would believe this, and that if these men who criticise would go to Philadelphia and see the work of Dr. Jackson and his associates, where they have given about five thousand treatments without any harmful results, they would be convinced. In the case of advanced bilateral bronchiectasis shown by Dr. Moore, in which he said the cause was unknown, I would suggest that in such cases, the maxillary sinuses be investigated, as they are often the cause. Any prolonged lung suppuration will produce a bronchiectasis. When the bronchus is greatly dilated and the walls thickened we cannot apply the word cure; but the condition can be greatly improved. They raise large amounts of very foul secretion, and the breath is very fetid. When they sit down to the table to eat the act of swallowing warm food causes them to cough and raise. All this prevents them from associating with their fellows and they are more or less banished. Surgery is applicable to some cases of lung abscess, but advanced bronchiectasis is bi-lateral and does not lend itself well to surgery. The internists use

postural drainage; this does good, but will not empty the cavities completely. I always have these patients carry on their postural drainage just before coming to the operating room to be bronchoscoped, and I have always found a residue. Therefore, bronchoscopy has its place in the treatment of lung suppurations. I would like to know more about the bacteriology in these cases; we think we find the Pfeiffer bacillus quite often and yet we cannot get our bacteriologist to say much about this organism. The method of getting the smear and culture directly from the cavity through the bronchoscope is valuable. In a case seen recently, a lung abscess of eight years' duration, following the inhalation of a tooth, the patient had been sent to Colorado for pulmonary tuberculosis because her sputum was said to be a Gaffky III. Smears taken through the bronchoscope proved this to be a mycelium, taking an acid fast stain and not a tubercle bacillus.

DR. MCGINNIS (Chicago): I should like to ask Dr. Moore if any of the cases of bronchiectasis and lung abscess have shown spirochetes or fusiform bacilli. Some time ago there was some discussion on the finding of these organisms in lung abscess. The patients were treated with neosalvarsan and salvarsan, and the results were good, although there were no bronchial washings.

DR. MOORE (closing): I am not prepared to answer Dr. Mullen's question at this time. There is nothing of any known value in this connection. We have not as yet treated enough cases to make a bacteriological classification showing the resistance of certain forms. The predominant strain has been used in the making of vaccines, and we have gotten better results by this means; but as to one strain of bacillus being more concerned than another, I don't think we have enough evidence to say at the present time. In one case of a soldier who had been gassed, we isolated a fusiform bacillus. He was given neosalvarsan with fairly good results.

Synergistic Anesthesia in Laryngeal, Tracheal and Bronchial Procedures.

Dr. Joseph C. Beck, Chicago, Ill.

DISCUSSION.

DR. SHURLEY (Detroit): I have had no experience with this particular method. We have tried either by rectum and we had so much trouble that we never tried it again. I shall have to go to Chicago and learn the method.

DR. WAUGH: In plastic work during the war, Major Gillies used this method quite frequently. In two cases alarming effects followed the operation. The patients went into collapse and it was necessary to use artificial respiration. No patients died, but the condition was very alarming. We used ether, paraldehyde and olive oil, but I do not remember whether we gave a preliminary dose of morphin or not.

DR. GALBRAITH: While serving as an interne about eight years ago, we used this method of anesthesia in a number of cases. We introduced a certain amount of ether per body weight and the results were very unsatisfactory. We then changed the technic and used the ether and oil mixture, introducing it slowly until a sufficient effect was obtained and got splendid results. I believe that in certain cases, such as removal of fibroma from the upper respiratory tract, the method works out very well.

DR. CARMODY: Was there any rectal irritation? In early cases reported there was some sloughing.

DR. BECK (closing): In seventeen hundred cases we should have had some bad results if there were going to be any. You must not confuse this with rectal anesthesia. In those cases 6 oz. ether was used instead of 2 oz.—a very different thing. This is not anesthetic, it is analgesic. I have never had any complaint, even of tenesmus. The alarming symptoms were due no doubt to a different method. In the army they used irrigation by iced water to get the ether out of the rectum. Some patients are very susceptible and I have sent them back to bed until they were out of the deep sleep. It saves having nervous, irritable patients, who otherwise are very difficult to operate upon.

